

# NATIONAL CAR-BUILDER

VOLUME XIV.  
NUMBER 7.

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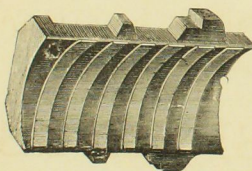
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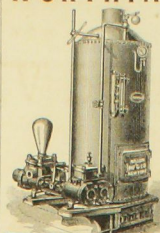
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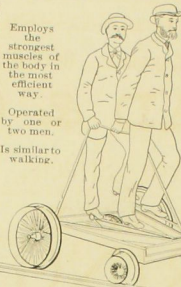
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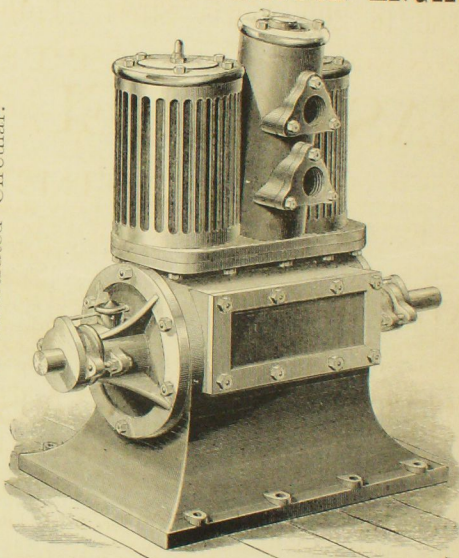
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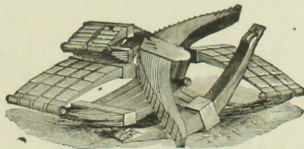
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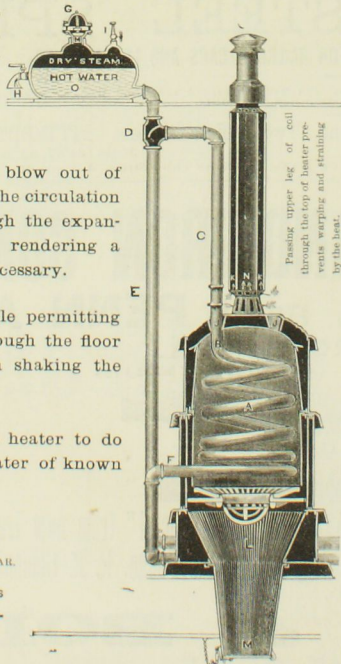
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When the fire is low the pipes may be refilled through the funnel cock, without requiring the pipes to be cooled off.



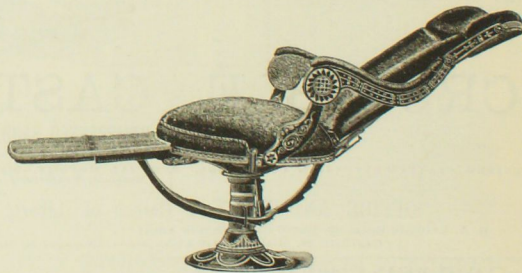
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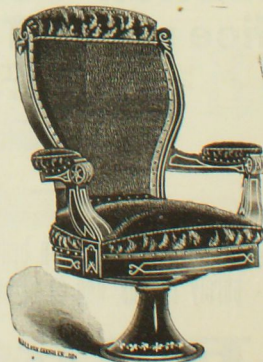
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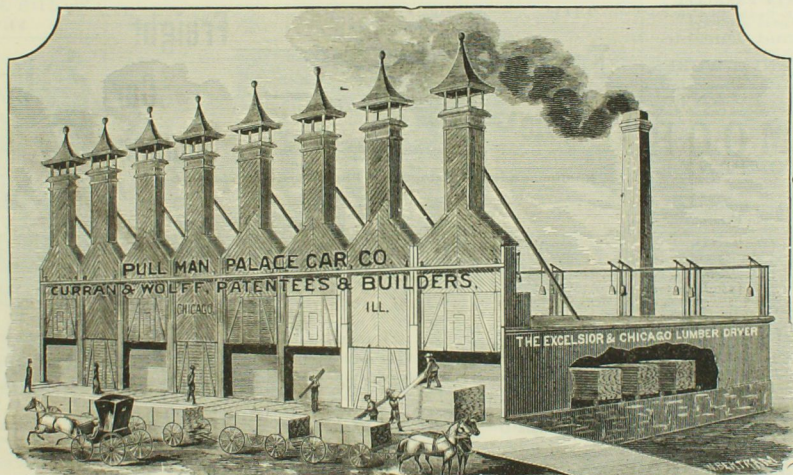
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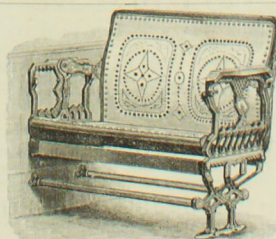
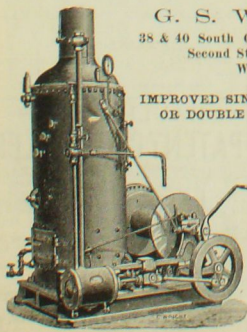
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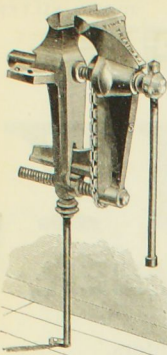
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paper gives dark blue lines on a white background  
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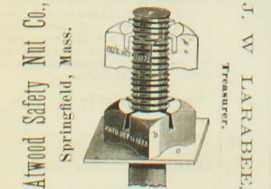
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Light, Strong, Simple, Durable.  
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Both Head and Shoe  
quickly adjustable, the  
latter also easily reversi-  
ble when required. All  
the corresponding parts  
of each thoroughly in-  
terchangeable.

Write for circular  
and Price.  
**STANDARD  
BRAKE SHOE CO.**  
FORT WAYNE, IND.

**Atwood Safety Nut Co.,**  
Springfield, Mass.  
The Atwood Nut on bolt without bearing on base-  
plate open.  
b. Atwood Nut turned to bearing c. partially  
closing the slots and grasping the bolt.



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TREASURER.

### MORSE TWIST DRILL AND MACHINE COMPANY

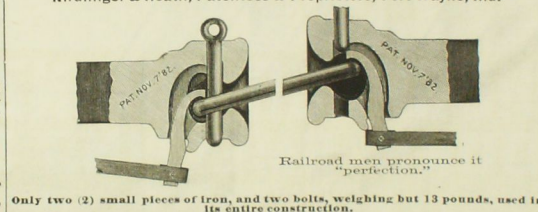
MANUFACTURES  
Patent Twist Drills, Machine Bits for Wood, Bit Stock Drills, Reamers, Standard Gauges, Milling Cutters,  
and Special Tools, for use in Railroad, Car and Locomotive Shops. **NEW BEDFORD, MASS.**

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SOLE MANUFACTURERS OF  
**HARD & FLEXIBLE VULCANIZED FIBRE.**  
Flexible Vulcanized Fibre Dust Guards  
and Oil-Box Covers,  
being absolutely unaffected by oil or heat, are far more durable and  
efficient than Leather, and much cheaper.  
Office and Works; Wilmington, Del.

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Great Gold Medal. Progress Medal. Gold Medal.  
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**Safety, LIGHTING COMPANY,**  
Economy, Brilliancy.  
19 William Street, New York.  
H. HOWARD, Pres. F. KUHN, Treas. W. K. JEWETT, Sec'y.

**Fort Wayne** **Freight Car Coupler.**  
FTWAYNE COUPLER  
PATENT NOV. 7 '82.  
Nirdlinger & Heath, Patentees & Proprietors, Fort Wayne, Ind.



Only two (2) small pieces of iron, and two bolts, weighing but 13 pounds, used in  
its entire construction.

### GELATINIZED FIBRE FLEXIBLE DUST-GUARDS.

Superior to Leather or "Vulcanized Fibre."  
Keep the Oil in the Car-Boxes and Sand and Dust out of Them  
They are not affected by oil, grease or petroleum; do not  
cut the axles, as grit does not adhere to them; keep their shape  
well and will outwear several leather ones. Cut to order of any  
desired thickness or pattern. Send drawing or sample for esti-  
mate. This material is absolutely free from grit, and will  
not become brittle and break.  
NOW IN USE ON MANY LEADING RAILROADS, GIVING GENERAL SATISFACTION.  
Master Car-Builders desiring to cut their own washers can be  
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**THE IMPROVED DAYTON CAM PUMP.**  
Designed and built especially for BOILER FEEDING and for PUMPING HOT WATER.

Steam Pumps and Hydraulic Machinery  
For Railroad Purposes.  
The Combined Pump and Boiler, with Remov-  
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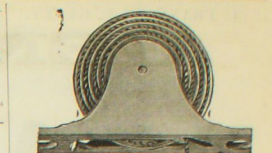
The Most POWERFUL FIRE PUMPS ever made.  
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STRONGEST AND BEST IN MARKET.

FOR ROLL NECK CAR JOURNAL AND MACHINERY BEARINGS.  
Babbitt's Anti-Friction METAL.  
MANUFACTURED BY

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For Passenger Coaches, Sleeping and Parlor  
Car Windows, consisting of Compound Spring  
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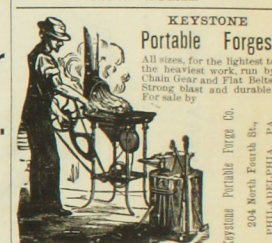
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**CABINET WOODS,**

SUITABLE FOR CAR WORK.  
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Portable Forges,  
All sizes, for the lightest to  
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Chain Gear and Flat Belts.  
Strong, blast and durable.  
For sale by  
Keystone Portable Forge Co.  
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The most durable Ratchet in market;  
has extra sleeve attachment. Price very  
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HAND & AUTOMATIC CYLINDER OIL PUMPS,  
Ball and Wheel Gauge Cocks, Fuel Cleaners, etc.  
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FOR FREIGHT CARS.  
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### HAULENBECK'S PATENT CAR COUPLER.

SIMPLE, EFFECTIVE AND CHEAP.  
Requires no change of  
Draw Heads or Links and  
Pins, except that pin being  
attached to coupler pre-  
vents its being lost or  
stolen.  
No loss of life or limb  
can possibly occur when  
used.  
Information furnished  
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# CHALLENGE COACH GREASE

—AND—

## HOT-BOX COMPOUND.

Guaranteed to run a car 5,000 miles with one greasing. We will furnish sufficient grease to make a thorough trial, and make no charge for same unless it gives absolute satisfaction.

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DEAR SIR: The following is a report of test made with "Challenge Coach Grease," under passenger coach No. 69 up to date: Car made 8,200 miles the first greasing (one box hot); removed journal bearing; applied more grease to the seven other bearings, and continued the test until car had made 30,600 miles. Average reduction by friction, 8 oz. per bearing; average mileage to 1 oz. of reduction, 2,575 miles. Amount of grease used since being packed, 4 oz. to each box or two applications, or 8 oz. to each box in all during test.

I certify that the above report is correct.

R. H. CHAMBERLAIN, Div. Supt. Illinois Div.

Approved:

A. J. BIRD, Foreman Passenger Depot,  
C. R. I. & P. Railway.  
B. K. VERBYCK, M. C. B.,  
C. R. I. & P. Railway.  
GRAND RAPIDS, March 6, 1883.

W. S. CALHOUN &amp; CO., CHICAGO—

DEAR SIR: Referring to your "Challenge Coach Grease," for railway coaches, I have this to say: that, after a thorough trial, I find it far superior, in every respect, to any grease we have yet used. The journals of the coach that were packed with your grease on December 9 last, on examination to-day look as well as when first filled. Said coach has run 180 miles every day since journals were filled, viz., Dec. 9. I am perfectly satisfied that the "Challenge Coach Grease" will do all that is claimed for it, and have recommended its use on all our coaches.

Respectfully yours,

MAT. SCHOOF, Car Examiner,  
For Chicago & West Michigan Railroad.

Price, 45 Cents per Gallon, f. o. b. Chicago. Address

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Manufacturers and Jobbers of Oil and Waste, and Sole Agents for CHALLENGE COACH GREASE.

Correspondence solicited.

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## RAILWAY TRAIN BRAKES.

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THE EAMES BRAKE is confidently offered as the most efficient, simple, durable and cheapest power Brake in the market. Can be seen in operation upon over eighty roads.

ARE PREPARED TO  
SUPPLY AT LOW RATES  
BEST QUALITY  
PHOSPHOR BRONZE  
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BEARINGS.

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SUCCESSORS TO GEORGE K. TRYON SON &amp; CO PHILADELPHIA.

MEDAL AWARDED  
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PHOSPHOR BRONZE  
CASTINGS.

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EXTENSIVE MAKERS

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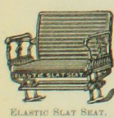
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N. Y. ELEVATED R. R.  
ILL. CENTRAL R. R.  
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BALT. & O. R. R.  
AND ONE HUNDRED  
OTHERS.



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AND

SAMPLES FURNISHED

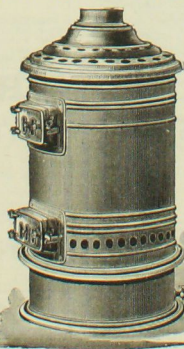
ON

APPLICATION.

WINSLOW'S IMPROVED SAFETY CAR HEATER AND VENTILATOR.

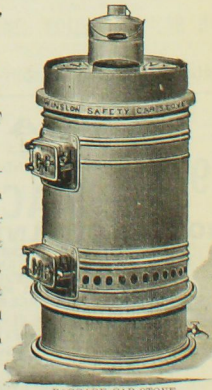
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SAFEGUARD  
AGAINST FIRE  
IN CASE OF  
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The Strongest and  
most Durable Stove  
made. The most  
economical, on ac-  
count of the very large  
volume of air heated.  
Their use insures  
HEALTH, SAFE-  
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FORT.



For BAGGAGE,  
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PRESS, CA-  
BOOSE AND  
EMIGRANT  
CARS.

With Flat Top, ar-  
ranged for trainmen  
to warm their dinner  
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made of No. 16 irons,  
so that they will not  
jam by baggage or mail  
coming in contact with  
them.



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Evening trains leave CLEVELAND daily with Rotunda Sleeping Cars for COLUMBUS, CINCINNATI, INDIANAPOLIS, LOUISVILLE, TERRE HAUTE, EVANSVILLE, ST. LOUIS and all points West and South. Morning trains leave daily, except Sunday, with Through Palace Coaches, for COLUMBUS, CINCINNATI, INDIANAPOLIS, LOUISVILLE, and ST. LOUIS without change. This is the only line making direct communication with all the Principal Trunk Lines of the East for NEWYORK, MEMPHIS, NEW ORLEANS and all points in Texas, either by way of LOUISVILLE or ST. LOUIS. Direct connection at ST. LOUIS for all Railway Towns in Kansas, Nebraska and Colorado.

Equipment Complies all Valuable Improvements.

E. B. THOMAS, General Manager.

A. J. SMITH, General Ticket Agent.

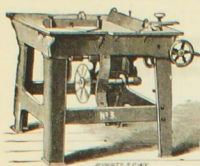


CLEVELAND TWIST DRILL COMPANY,  
COX & PRENTISS

22, and 26 West Street,

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Wardwell Saw Benches a specialty.

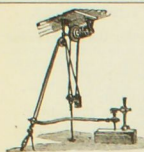
These machines are in use in the car-shops of the Penn. R. R., N. Y. & O., P. & W. & R. R. & A. & P. R. R., and some fifty other of the largest shops in the country.

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Do not buy until you send for new descriptive list, stating just what you want enclosing stamp.

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SOLE MANUFACTURER  
UNDER LETTERS PATENT  
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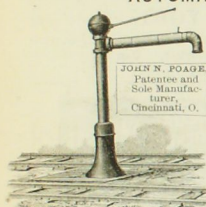
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"1882. STANDARD."

The Freeman draws it round and depresses the lever.  
The acts of closing valve, opening and closing waste, and returning to its position parallel to track, are all

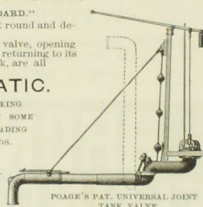
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FOAGE'S PAT. UNIVERSAL JOINT TANK VALVE.

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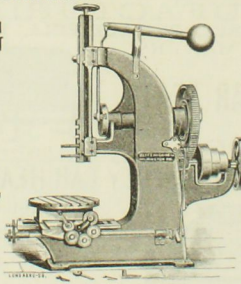
IRON AND STEEL WORKING  
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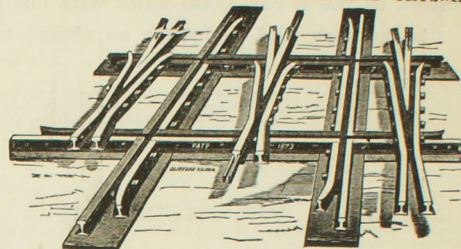
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FROM 1-4 To 10,000 lbs. WEIGHT.

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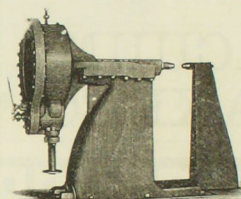
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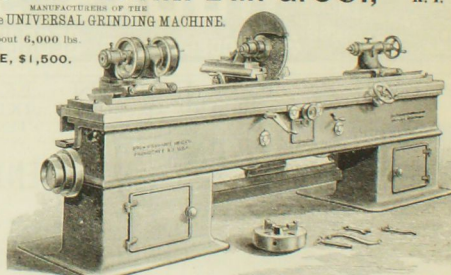


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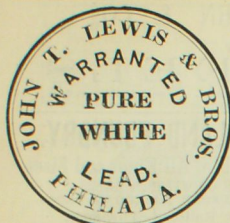
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No. 231 South Front Street,  
Important to Railroad Managers  
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**SIBLEY'S PERFECTION VALVE OIL.**

More perfect lubrication insured, and entire freedom guaranteed from corrosion of cylinders and destruction of steam joints by fatty acids.

In exclusive use on 30 railroads.

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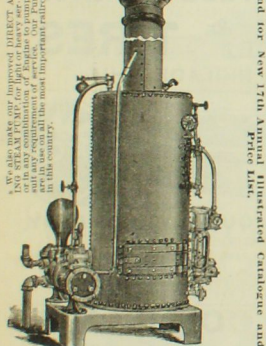
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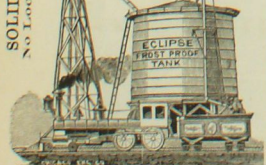
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Tested 14 years. Perfectly self-regulating. Con-

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most powerful wind mill made.



**Frost Proof Tanks**

100 to 100,000

Gallons capacity, with

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**Outlet Valves Spouts**

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Improved Double-Acting Pumps.

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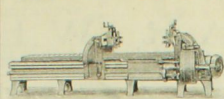
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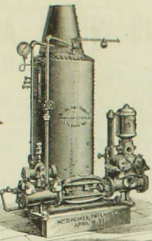
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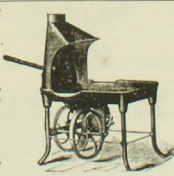
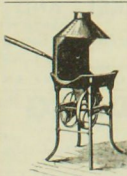
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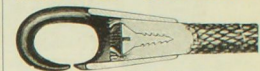
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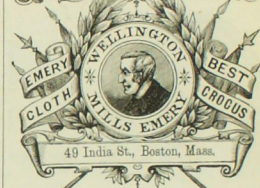


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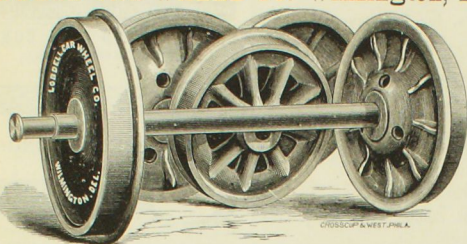
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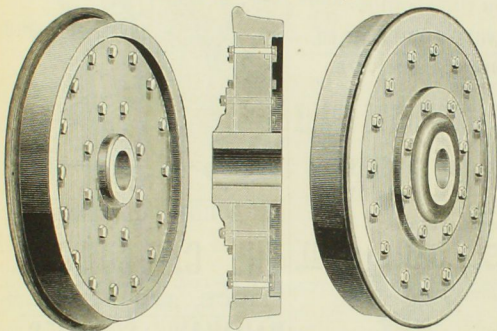
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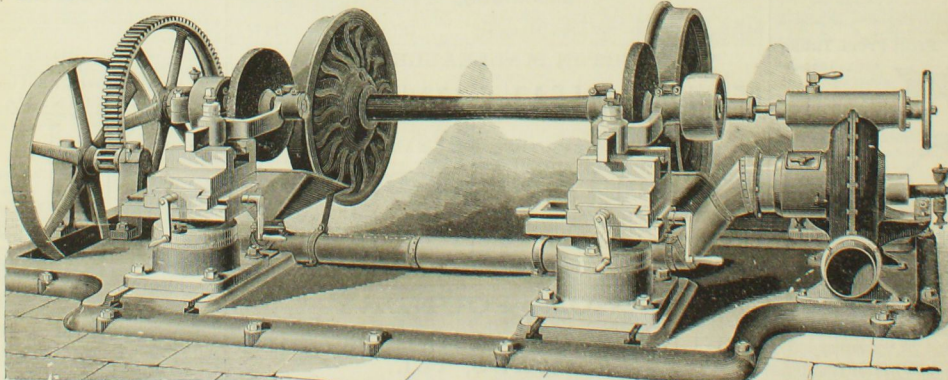
Wheels with flat places, and otherwise badly worn, that are ordinarily condemned and used for scrap iron, can be ground and fitted so as to double their original mileage. This alone makes our machine the greatest money saver ever introduced to railroads.

A sound Chilled Car Wheel trued by our method cannot be excelled by a paper or any other description of Car Wheel with steel tire.

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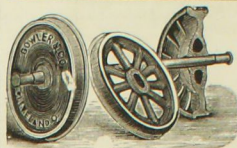


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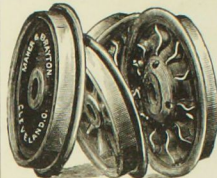
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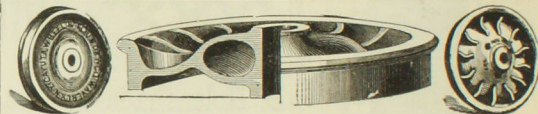
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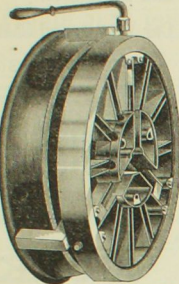


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JAW, with both face and bite of Jaws ground per-  
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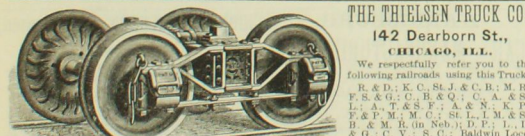
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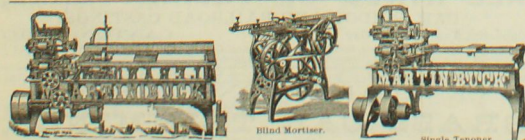
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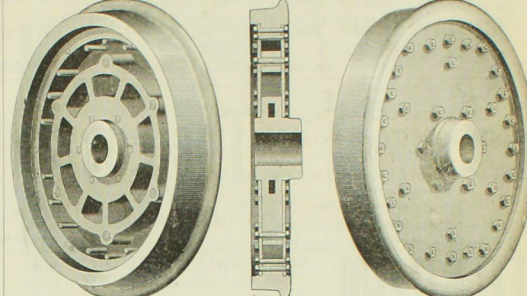
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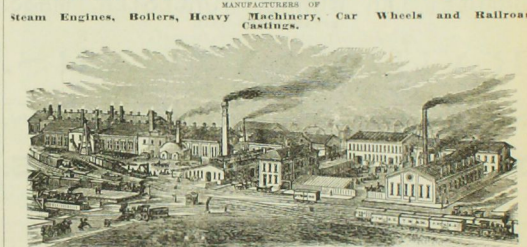
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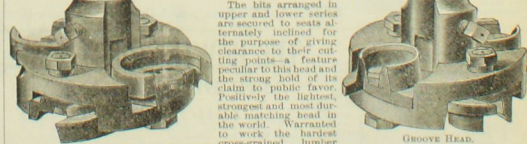
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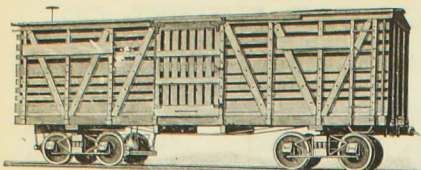
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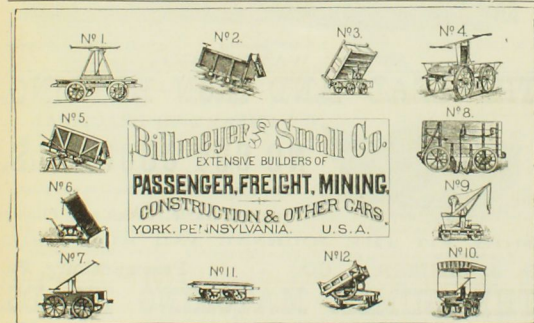
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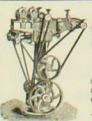
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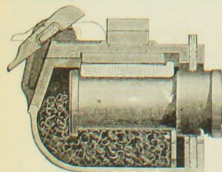


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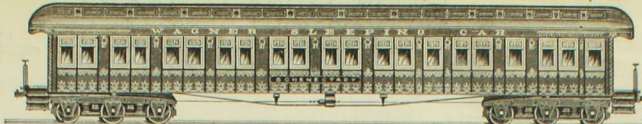
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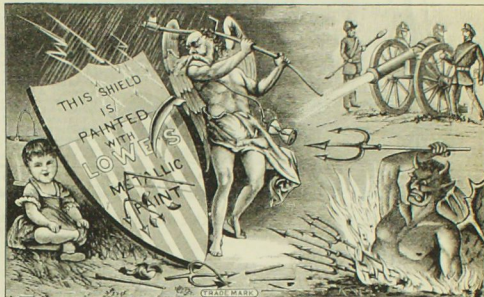
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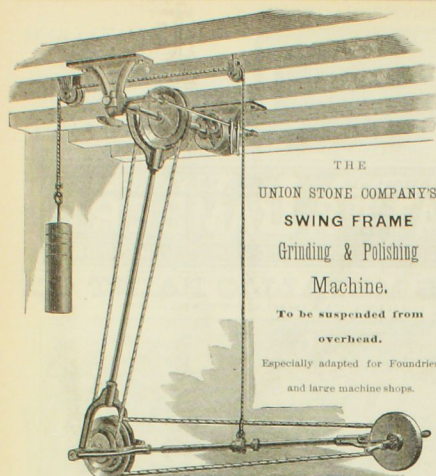
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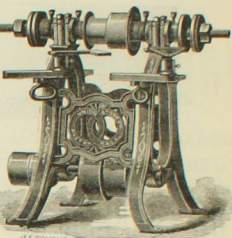
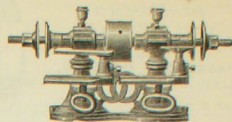
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Wood-Polishing Wheels, Emery, Quartz, Corundum,  
GRINDERS' AND POLISHERS' SUPPLIES.

Catalogue on Application.

The work is placed on the floor, bench or truck, the emery wheel is swung at will to conform to the straight or uneven surface. The wheel being driven from a swinging countershaft, suspended by a telescopic rod with a universal joint, may be carried back and forth or swung at will; and the frame carrying the wheel being also suspended by the countershaft weights, joined to a similar horizontal telescopic rod, making it easy to twist the wheel over to any angle or give it any range of movement up or down. The operator can seize the handles on each side of the wheel, and carry it to any portion of the work desired. A boy can operate it. By substituting a circular "Scratch Brush" for the wheel, its value in the cleaning room of a foundry is apparent to all familiar with the old laborious hand process. The machine is also a valuable accession to the machinery of any general machine shop, for grinding off fine spurs and imperfections, instead of chipping and filing. It leaves the work looking better, and may be performed by a cheaper hand, and by substituting a polishing wheel for a grinding wheel the work can be finished to a fine point.



## GILBERT CAR MANUFACTURING COMPANY, TROY, N. Y.

URI GILBERT, Pres. and Treas.

B. E. RICKER, General Manager.

WM. E. GILBERT, Secretary.

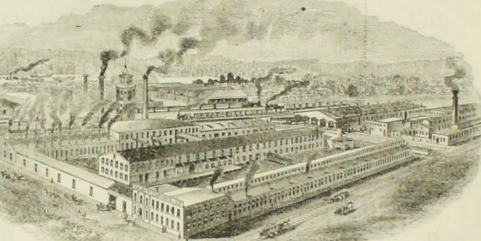
EDWARD G. GILBERT, Vice Pres. and Asst. Treasurer.

MANUFACTURERS OF

ALL KINDS AND SIZES OF

Steam and Street  
RAILWAY CARS

Building, Dissecting and  
Packing Cars for Export  
a Specialty.



ESTABLISHED 1820.

INCORPORATED 1879.

## THE COWELL PLATFORM

is the only device making A CONTINUOUS FLOOR between cars in motion.

IT ABOLISHES JERKING AND JOLTING, AND RUNS CARS STEADIER THAN ANYTHING AND EVERYTHING ELSE KNOWN.

We refer to the Flint & Pere Marquette R. R., which recently fully adopted our device, and to the following:

NEW YORK & GREENWOOD LAKE RAILWAY.

SUPERINTENDENT'S OFFICE, JERSEY CITY, May 22, 1882.

ROBERT HARRIS, Esq., Vice Pres. N. Y. L. E. & W. Ry.

In accordance with instructions contained in your letter of April 4th, I delivered one combination car and two coaches to the Cowell Platform Company, which they promptly equipped with their patent buffer, since which time the cars have been in constant service.

On Friday, May 19th, the buffers were subjected to a severe test. In the presence of several prominent railway officials, and more than the Cowell Company claimed for them. Matches and tin snips were placed between the buffers, in order to see if in starting or stopping the buffers would separate enough to let an article so small pass between them. In all these tests the tension kept up to its work and made the platforms continuous. There was no perceptible jerk when starting, and several times a high rate of speed was reached when the engine was reversed, the air applied and a danger stop made without any jar or unpleasant sensation felt other than in making an ordinary station stop. I feel justified in saying, I believe the Cowell Buffer to be a great improvement over any other device I have seen, and should be pleased to have the coaches of the Greenwood Lake Railway Company equipped with this device, believing the saving in the end would justify the expense.

J. H. TINSLEY, Acting Supt.

L. S. & M. S. Ry. SUPERINTENDENT'S OFFICE, EASTERN DIVISION.

J. F. HERBICK, Esq., Sec'y and Treas. Cowell Platform and Coupling Co., Cleveland, O., April 7, 1882.

DEAR SIR:—Having witnessed the exhibition of the "Cowell Platform and Buffer," at Cincinnati, March 22d, 1882, will say that in my opinion it is an excellent device. It is a safe and convenient Buffer, keeping the train very steady while in motion, especially over track of uneven surface and curves, thereby being no "lost motion" between the cars, which prevents the jolting and jarring occasioned by starting and stopping trains, as with the ordinary platform, thus saving much annoyance to passengers.

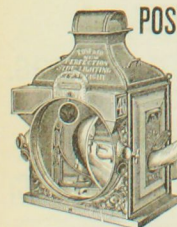
Yours truly,

CHAS. B. COUCH.

S. L. Bell, Conductor on the Western & Atlantic R. R. says: "For two years I have been running a train of cars with your appliances, and I consider it the most practical and the most perfect device in use. It runs a train of cars steadier. I think, if properly managed, it will be a great saving to railroads, and I know affords much more comfort to the traveling public."

For further particulars address  
W. STAGER, Gen. Manager.

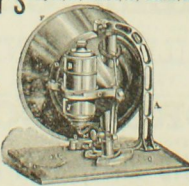
THE COWELL PLATFORM & COUPLING CO., CLEVELAND, OHIO.



## POST & COMPANY'S

NEW PERFECTION  
SIDE-LIGHTING  
HEAD-LIGHT,  
Largest and BEST  
MADE.

The New Reservoir is constructed on our American Standard Lamp principle, which keeps level at a constant level until all is consumed, thereby saving 2 inches of each wick, and removing the uncertainty of the flame, caused by splashing of the large body of oil in the reservoir of ordinary Head-Lights, out to be refilled. Send for Circular of



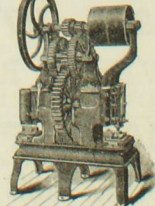
View showing Manner of Mounting Reflector, and New Oil Reservoir. This reservoir can be readily taken out to be refilled. Send for Circular of

REVOLVING AND STATUARY LIGHTS.

## POST & CO.,

Patentees and Manufacturers,

CINCINNATI, OHIO.



## COMBINED PUNCH AND SHEARS.

Prices from \$625 to \$1,000.  
SIX SIZES MADE.

Warranted to be of greater capacity for the price than any other machine in the market.

IN USE AND ENDORSED BY  
C. & Q. R. R. CO., UNION IRON & STEEL CO., CHICAGO;  
WEIR PLOW CO. (3); BROWN CORN PLANTER WORKS.  
MANUFACTURED BY  
G. D. COLTON & CO.,  
GALESBURG, ILL.

For Correspondence Solicited. State where you saw this ad.

C. F. LELAND, Pres.

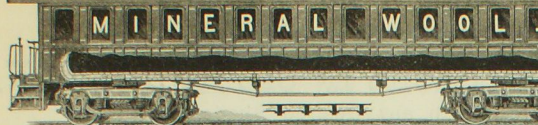
E. M. GRANT, Gen. Manager.

## THE CLEVELAND CRUCIBLE STEEL CO.,

TOOL, FILE, SPRING, MACHINERY,  
CLEVELAND, OHIO.

AGENTS: Boston, Jas. J. Kelly, 38 Kilby St.; Chicago, Campbell & Lill, 228 Lake St.; New York, Temple & Lockwood, 12 Platt St.; Cincinnati, Jno. C. Erb & Co., 10 West Third St.; St. Louis, W. C. Kennedy, 312 North Second St.





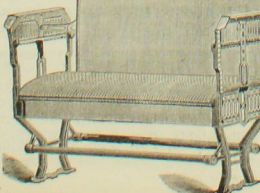
## Index to Advertisements in the National Car-Builder

[illegible]

THE "WOVEN WIRE" CAR SEAT.

Requires only one pound of hair to cover seat and back cushion. The wire fabric giving an open support in place of canvas, allows all dust to pass out bottom of the seat, rendering the seat the most cleanly in the house. The hair has a perfect spring for great elasticity may be used with spiral springs. This seat WILL LAST A LIFETIME. Requires less upholstery material than any seat ever before. The upholstery material without hair, as with simple covering of canvas and plush, or used uncovered. Comfortable in every part, conforming closely to shape of body. Requires no sewing. Saves upholstery labor and money at saving of expense and labor in upholstering. Samples furnished.

**HENRY ROBERTS, Patentee,**  
**P. O. Box 363. HARTFORD, CONN.**  
 References: N. Y., Ont. & West. R. R., Ft. Wayne, Cin. & Louisville R. R., Boston & Prov. R. R., No. New Hampshire R. R., N. Y., N. H. & Hfd. R. R., Wor. & Nashua R. R., Scioto Valley R. R., Pitts. & West. R. R., etc., etc.



# The Smith Exhaust Fan

FORGE AND PRESSURE  
BLOWERS.



Best in the World.

Cheapest in the World.  
SAVES 5 PER CENT. OF POWER  
APPLIED

As against other kinds of Exhaust Fan

**Huyett & Smith Manufacturing Co.**  
PATENTEES AND SOLE MANUFACTURERS,  
P. O. Box 466, DETROIT, MICH.



**F. W. DEVOE & CO.,**

Cor. Fulton and William Streets,

NEW YORK,

MANUFACTURERS OF

**DRY COLORS, COACH AND CAR COLORS IN OIL AND JAPAN.**

Special Colors Compounded to Match any Desired Shade.

FINE RAILWAY VARNISHES AND JAPANS FOR PASSENGER COACHES.

Also Freight Car, Caboose and Bridge Paints Ready for Use. Fine Brushes for Railroad Car and Coach Painting. All Kinds of Painters' Supplies and Artists' Materials.

Mixed Paints—A Large Assortment of Desirable Shades for Inside and Outside Work.

To insure Durability, Uniformity and Economy Railroad Companies will save themselves great trouble in painting by allowing F. W. Devoe & Co. to prepare their Passenger and Freight Car Colors, as they manufacture from the crude materials, which are the component parts of any shade, and therefore understand better their chemical relationship, when in combination, than can be possible to those who simply buy their dry materials and then grind them. SEND FOR CATALOGUES AND LISTS OF SAMPLE COLORS.

MANUFACTURERS OF  
RAILWAY CAR  
VARNISHES.**JOHN BABCOCK & CO**NO. 2  
LIBERTY SQUARE  
BOSTON, MASS.

ESTABLISHED 1832.

**VALENTINE & COMPANY,**

INCORPORATED 1882.

FINE COACH AND CAR

**VARNISHES**

MAKERS OF

TRADE **VALENTINES** MARK

NEW-YORK.

245 BROADWAY.

"THE STANDARD FOR QUALITY"

BRANCHES:

CHICAGO, ILL.,

68 Lake Street.

BOSTON, MASS.,

153 Milk Street.

PARIS, FRANCE,

91 Champs Elysees.

**J. RAYNER.**

IMPORTER OF AND DEALER IN

**VENEERS, MAHOGANY, CABINET WOODS.**

STEAM, BAND AND VENEER SAW MILLS.

Foot Houston st., E. R., N. Y.

RAILWAY  
VARNISHES.**MOSES BIGELOW & CO**  
EST. 1845 NEWARK, N.J.

FINEST

STATION COLORS.

DRY &amp; COACH COLORS,



PARKER'S COACH PAINT.

TRUCK AND ROOF SHADES,

MANUFACTURERS,  
CHICAGO.ALL GOODS GUARANTEED IN  
QUALITY.

Established 1852.

Albany Car-Wheel Works.

Albany, N. Y.

GEO. H.

CAR WHEELS

MANUFACTURED

THACHER

AND

The Best Brands  
OF  
CHARCOAL IRON  
ONLY.

&amp; CO.

Engine Wheels.

BOUND VOLUMES OF THE NATIONAL CAR-BUILDER

For 1880, 1881 and 1882.

Price, - - - \$3 00 each.

**AJAX METALS,**

Especially Adapted for LOCOMOTIVE, CAR, ROLL-NECK and MACHINERY BEARINGS, and for Pump-Rods, Valves Plungers, etc., for Mine Use where sulphurous water and acids are found

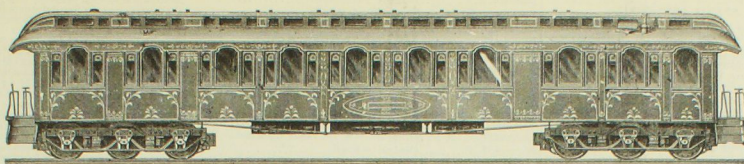
LETTERS PATENT have not been taken out, so that any one using our goods runs no risk of being associated with any lawsuit. NO INTERFERENCE can be filed against the use of Ajax Metals on the contrary, letters of recommendation from the leading steel and iron mills, foundries and machine shops of this country are shown upon application. Also reports of tests as made by MASTER CAR-BUILDERS and MASTER MECHANICS, who are acknowledged AUTHORITY. Full information given on application to

THOMPSON, EPPING & CARPENTER, Pittsburgh; POST & CO., Cincinnati; M. M. BUCK & CO., St. Louis; NAUMKEAG METAL AND FOUNDRY CO., Boston; WORSWICK MANUFACTURING CO., Cleveland; FULTON IRON AND ENGINE WORKS, Detroit; PETTIBONE & MULLEKIN, Chicago.

THE AJAX METAL COMPANY, No. 14 North Fifth Street, Philadelphia, Pa., Sole Manufacturers of AJAX METALS.



# THE NATIONAL CAR-BUILDER.



DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XIV  
NUMBER 7.

JULY, 1883.

[SINGLE NUMBERS, TEN CENTS.  
\$1.00 PER ANNUM.]

## Miscellaneous Items.

The New York, Pennsylvania & Ohio road has been leased to the New York, Lake Erie & Western.

The Horton Chair Co., of Kansas City, Mo., exhibited its reclining car chairs at the Chicago Exposition.

The new shops of the C. B. & Q. road, at Burlington, Ia., are about ready for operation. Underground shafts are used for transmitting power.

Some very satisfactory tests of the American Brake Co.'s system of brakes were made on the Lake Erie & Western road, at Lima, O. on June 16 and 20.

MR. CHAS. F. JAURET, who was for a number of years past the Master Mechanic of the United States Rolling Stock Co., died at his residence in Chicago, June 17, aged 65 years.

The New York Central & Hudson River road has received fifteen new passenger cars from the Jones Car Manufacturing Co. The inside finish is in solid mahogany, and the trucks have 42-inch Paige wheels.

The New York Central shops, at West Albany, are building four 60-foot postal cars with six wheel trucks and 42-inch Paige wheels; also, three 56-foot combination cars, 13 baggage cars and three passenger coaches.

The C. C. C. & I. road is adding ten new passenger coaches to its equipment. They are built by the Barney & Smith Mfg. Co. Eight have been received and are now running. They are 45 feet long, have Allen paper wheels, and are finished inside with mahogany.

The Fort Wayne shops of the Pittsburg, Fort Wayne & Chicago road are building five consolidation engines with 20x26 cylinders. These engines will weigh in working order nearly 50 tons each. These shops have received recently the last of about \$90,000 worth of new tools.

MR. CHAS. L. HEYWOOD, formerly Superintendent of the Fitchburg R. R., was run over and killed by a switching engine, at Watertown, Mass., on the 23d of June. The accident occurred at the Union Stock Yards at that place, of which he was superintendent. He was 60 years of age.

At the shops of the Cincinnati, Hamilton & Dayton road, at Cincinnati, some old flat roof passenger cars have been modernized by the addition of raised or clear-story roofs. The cost of the addition for a passenger car, including iron carlines, is \$350; and for a combined passenger and baggage car, without the use of iron carlines, is \$398.

The Indianapolis Journal says that a car-coupler inventor from New Jersey sold his patent at the Chicago Exposition to a syndicate of railroad men for \$30,000 cash in hand. The other exhibitors of car-couplers claim that the one sold was the poorest of the lot. This will doubtless have the effect of causing renewed activity among this class of inventors.

MR. JOHN A. PARKS, of New York City, has patented an improved mold or matrix for producing chilled castings so that the castings will always be mathematically alike in size, a thing supposed to be impossible by present methods. It is claimed that car wheels cast in this way will be perfectly true, and of a uniform circumference, so as to do away with the necessity for grinding the treads. If this is so it is a "big thing."

MR. G. W. RHODES, the Superintendent of Motive Power of the C. B. & Q. road, has recently organized at the Aurora shops a laboratory department for testing springs, oils, iron and other material. A 100-ton testing machine has just been put in. The advantages of such a department are becoming more obvious upon all roads every year. In the locomotive shops 12 engines are being overhauled, the interchangeable system greatly facilitating and cheapening the process.

The eighth annual convention of the Yardmasters' Benefit Association of the United States and Canada was held at Denver, commencing June 13. Most of the report shows an increase in membership of 288 the last fiscal year, and the affairs of the association are in a thoroughly prosperous condition. About 200 delegates were present, representing every State in the Union. The local organization tendered a banquet and grand ball Thursday night. Ex-

cursions through the mountains consumed the rest of the week.—*Railway Age*.

THE shops of the C. C. C. & I. road at Cleveland, O., are building a number of Mogul engines, 18 x 24 cylinders. They are fitted with injectors instead of pumps, and some have the extended smoke arch. Eight 56-foot passenger coaches, finished in mahogany, and having Searle heaters and Janney couplings, have recently been received from the Barney & Smith Co., and six coaches of a similar pattern, designed by Mr. A. Steinbrunner, the Master Car-BUILDER of the road, are in course of construction at the shops. The company is having four passenger cars rebuilt at the Litchfield (Ill.) Car Works, and the Mattoon and Brightwood shops are building Mogul engines.

THE Mt. Savage (Md.) Locomotive Works are building two passenger engines, 12 x 24 cylinders, for the East & West Railroad of Alabama, and one Consolidation, 15 x 18 cylinders, for the Austin & Northwestern Railroad of Texas. A 14 x 18 cylinder Mogul was recently completed for the Chicago Exposition. These engines are all 3 ft. gauge. The passenger engines have 44-inch drivers; driving wheel base, 6 ft. 6 in.; diameter of boilers, 42 in.; fire box, 52 x 20 in.; 105 flues, 2 in. diameter; weight of engine, 38,000 lbs.; weight on drivers, 25,000 lbs. The Mogul has 40-inch drivers; driving wheel base, 10 ft.; diameter of boiler, 43 in.; fire-box, 65 x 19 in.; 130 flues; weight on drivers, 44,000 lbs.; total weight, 49,000 lbs. The Consolidation has 36-in. drivers; driving wheel base, 8 ft. 4 in.; diameter of boiler, 48 in.; fire-box, 68 x 23 in.; 143 two-inch flues; weight on drivers, 51,000 lbs.; total weight, 56,000 lbs.

At the shops of the Chicago, Burlington & Quincy road, at Aurora, Ill., ten second-class coaches are in course of construction. They are 49 ft. 2 in. in length, and 9 ft. 8 in. wide. The inside finish is in oak, ash and cherry. The clear-story ceiling is made of pine strips 1 1/4 in. wide, tongued and grooved and laid lengthwise. The aisle between the seats is laid with alternate walnut and maple strips. A peculiar method for stiffening the car body without using brace-rods, is a noticeable feature in the construction. The sills are slightly arched between the bolsters, and their ends also are inclined upwards. A strip of sheet iron about 1/4 in. thick and 28 in. wide, with a piece of angle-iron riveted to its lower edge, is then fastened by wood screws to the studding and window-posts on the inside, while the angle iron is fastened in like manner to the sill. The iron in connection with the sill forming a truss-plate which is said to be stronger and more unyielding than brace-rods. The inner surface of the sheet iron is grained. Baggage cars are trussed in a similar way by fastening the sheet iron to the inside of the sill, the strip being wide enough to reach about 10 in. below it. To each side of the iron underneath a plank is then bolted, the bolts running through the wood and iron, and the whole forming an effective truss. Two 40-foot mail cars trussed in this way are also being built. In addition to the above, the Aurora shops are engaged upon 10 new refrigerator cars and 40 thirty-four-foot flat cars, and 15 coaches are constantly in for repairs and repainting. The collarless journal is used on the new standard passenger trucks of the road. The two mail cars and five of the second-class coaches have paper wheels.

The *Railway Review* says that one of the most noticeable features of the exhibit of the Pullman Car Co. is a train consisting of a baggage car, a smoking car, a first-class coach, and chair car, built for the Chicago & Atlantic Railroad, to be used on the new through line from Chicago to New York. A portion of this train was built at the Pullman, Ill., shops, while the balance was turned out from the Detroit shops. The train is fitted with 42-inch Allen wheels in four-wheeled trucks. The cars are of a dark color, with comparatively plain finish outside, as far as ornamentation goes, and have the standard Miller couplers and Westinghouse automatic brakes. The train, with the exception of the baggage car, is lighted by the Pintsch compressed gas system, and heated with Johnson heaters. The inside finish of the cars is neat, in light woods, wooden panels being used instead of lead-linings. The seats in the day coach are upholstered with red plush and those in the chair car with red leather. The seats in the smoking car are cane. The

chair car has washing conveniences, and in addition is fitted with a buffet well furnished, so that light refreshments can be supplied on the road. Dining car No. 206, for the Northern Pacific, is from the Pullman shops. This is a very long car, being 76 feet from out to out of draw-heads, affording a large and commodious kitchen. There is a double passage from the dining room around the side-board to the serving room, so that the waiters do not have to meet each other while passing to and fro. This car has dark outside finish, as is the balance of the Northern Pacific passenger equipment, and is furnished with six-wheeled trucks and Allen 42-inch wheels. Next to this car is No. 802, belonging to the same road. This car is a novelty in car equipment in some respects, being an emigrant sleeper. The seats, as well as the upper berths, which drop down in the usual manner, are made of wooden slats. This construction renders them capable of easy cleaning, as is necessary with the class of traffic carried. They can in fact be washed out inside with a hose without hurting any of the fittings. The seats forming the lower berths fit together in such a manner as to leave a raised end, which forms a foundation for a pillow. The outside finish is the same as in the other car, and the trucks also have 42-inch Allen wheels, but are four, instead of six-wheeled.

THE shops of the Chicago & Northwestern Railway, at Chicago, are full of work. In the locomotive department, seven eight-wheel road engines are in course of construction, and fourteen engines are in for overhauling. In the car department, 250 stock cars are being built; 500 additional ones have been received from the Peninsular Car Works at Detroit, and 500 box cars from Wells & French Co., Chicago. The shops have just completed ten of the road's standard passenger coaches (illustrated in January CAR-BUILDER), and the same number have recently been built by the Jones Car Manufacturing Co., the Jackson & Sharp Co., and the Barney & Smith Manufacturing Co., respectively, making forty in all. These cars are very attractive in appearance both inside and out, the inside being finished in mahogany and cherry, and the outside painted a light yellow. The drinking-water reservoirs are filled from the roof, which seems to be a new idea at the West, although it is quite an old one on the Pennsylvania and some other roads, the necessity of protecting the water from the impure air of the saloons being sufficiently obvious. The wood-working machinery and tools in the car department are arranged so that the movement of the material is continuous from its rough to its finished state. A piece of car-sill timber in the rough is first planed to size on its four sides, it then passes to a carriage where it is sawed to exact length, then the joint bolt-holes and tenons are cut, and another machine cuts the mortises to any size, number and shape that may be required. The sill is then shot out through a hole in the wall into another building, completely finished, the whole process occupying only twelve minutes. Mr. J. M. Moon, the Assistant Superintendent of Motive Power, intends putting a stationary engine on his transfer-tables, so a finished car can be pulled out and delivered on the main track with a great saving of time and expense. The use of templates has been very thoroughly systematized in these shops. In this way a great deal of skilled labor is dispensed with and the extra cost saved. In the construction of freight cars, the principal hand-work is in setting up or erecting, and five men can in ten hours have a car ready for the paint shop. The shavings are carried off by exhaust-fans. Nine passenger cars are being overhauled and twelve repainted. Concave center-plates are replaced by flat ones, owing to the cracking and breaking of the former. Weather-strips are put in the window sashes of the new coaches to keep out dust and prevent rattling. A new ventilating device is used by Mr. Moon with much success on his passenger cars. It consists of pipes encased between the windows and opening inside at the bottom near the floor, and outside on the roof. By this means ventilation can be maintained and the heat kept uniform when the windows and clear-story ventilator sashes are closed. Mr. Moon was formerly the General Master Mechanic of the Pittsburg, Fort Wayne & Chicago road, and his large experience in the mechanical departments of railroads, in connection with his estimable personal qualities, renders his services of especial value in the important and responsible position he now fills.



## Master Car-Builders' Association.

## SEVENTEENTH ANNUAL CONVENTION.

The seventeenth annual convention of the Association was held at the Grand Pacific Hotel, in Chicago, commencing on Tuesday, June 12.

The convention was called to order by the President, Leander Garey, of the New York Central & Hudson River Railroad.

Mr. E. S. ALEXANDER, chairman of the Chicago reception committee, was introduced by Mr. Garey, and made a few welcoming remarks, and in turn called upon Mayor Harrison to speak for Chicago's citizens. The Mayor admirably acquitted himself of his hospitable task in a short address fitting to the occasion, and President Garey responded for the association.

## LIST OF MEMBERS IN ATTENDANCE.

NAME.	COMPANY.	CARS OWNED.
Adams, F. D.	Boston & Albany R. R.	6,600
Adams, J. L.	Chicago & Atlantic.	
Avery, E. A.	Des Moines & Fort Dodge.	251
Aylesbury, Thomas.	Kan. City, St. Jo. & C. Bluff.	
Barber, J. C.	Missouri Pacific.	
Bissell, Thomas A.	Barney & Smith Mfg. Co.	
Blackwell Charles.	Norfolk & Western.	2,000
Blackall, R. C.	Delaware & Hudson Canal.	10,623
Bray, F. O.	Lake Shore & Michigan Southern.	
Briggs, R. H.	Mobile & Ohio.	
Bryan, H. S.	Chicago & Iowa.	
Burchard, C. H.	N. Y. Central & Hudson River.	
Bushnell, R. W.	Burlington, C. Rapids & Northern.	3,039
Carlton, Howard.	Buckeye Mfg. Co.	
Carter, E. D.	Terre Haute & Indianapolis.	
Cassidy, Thos.	Cin., Ind. & La. & Chicago.	
Chamberlain, J. T.	Boston & Albany.	
Chamberlain, W. E.	Providence & Worcester.	
Cloud, J. B.	Pennsylvania.	46,127
Coon, R. V.	Troy & Boston.	
Cooper, H. L.	Lake Erie & Western.	
Coulter, J. P.	Ohio & Mississippi.	2,473
Davenport, W. R.	Erie Car Works.	
Demarest, G. W.	Northern Central.	
Doran, J. E.	Boston & Albany.	
Dunbar, O. P.	Wheeling & Lake Erie.	
Duncan, T. G.	Cin., Wash. & Baltimore.	
Ellis, J. S.	Boston, Hous. Tun. & Western.	1,015
Ensign, J. P.	Ensign Mfg. Co.	
Fleming, S. W.	Petersburg.	137
Fletcher, J. B.	National Car Co.	
Ford, M. P.	Pittsburg, Cincinnati & St. Louis.	
Forney, M. N.	Railroad Gazette.	
Forsyth, William.	Chicago, Burlington & Quincy.	14,844
Fuller, William.	N. Y., Pennsylvania & Ohio.	7,408
Garey, C. E.	N. Y. Central & Hudson River.	
Garey, Leander.	N. Y. Central & Hudson River.	31,000
Gause, J. T.	Harlan & Hollingsworth Co.	
George, N. M.	Danbury & Norwalk.	
Goodrich, C. A.	Pittsburg.	
Goodwin, H. S.	Lehigh Valley.	18,085
Gore, C. E.	Lafayette Car Works.	
Gramling, G. H.	South Carolina.	
Griffith, S.	Continuous Draw-Bar Co.	
Greenland, Thos.	Lake Erie & Western.	
Hackathorn, J. L.	Kentucky Central.	
Hackney, George.	Atchison, Topeka & Santa Fe.	
Haines, S. W.	Pittsburg & Lake Erie Railroad.	1,526
Hall, J. K.	Boston & Lowell.	
Hoecker, F. J.	Peninsular Car Works.	
Hempbill, R. M.	Wabash, St. Louis & Pacific.	
Hildrup, W. T.	Harrisburg Car Co.	
Hill, John.	St. Paul & Duluth.	
Hodge, John.	Missouri Pacific.	
Hofecker, J. S.	Vulcanized Fibre Co.	
Holt, David.	N. Y. Central & Hudson River.	
Howey, Jacob P.	Rochester & Pittsburg Railroad.	680
Howard, F. B.	Pennsylvania.	
Hunt, F. B.	Pennsylvania.	
Irvine, S.	Missouri Pacific.	
Keeler, Sanford.	Plint & Pere Marquette.	
Keith, I. A.	Keith Mfg. Co.	
Kells, Ross.	New York & New England.	3,390
Kemison, Chas. H.	Maine Central Railroad.	2,450
Kirby, John.	Lake Shore & Michigan Southern.	
Kirby, J. B.	Lake Shore & Michigan Southern.	
Kohler, U. H.	Wabash, St. Louis & Pacific.	19,623
Leighton, J. T.	Continuous Draw-Bar Co.	
Lent, John S.	Tenn. & New York Canal & R. R.	4,066
Lyons, H. D.	Marquette, Houghton & Ontonagon.	1,400
McCrum, J. S.	Kan. City, Ft. Scott & Gulf.	1,725
McCarthy, H. C.	Pennsylvania.	
McCuen, J. G.	Sonora, Mexico.	
McDevitt, B.	Chicago West Division.	
McFarland, J.	Chesapeake & Ohio.	
McGee, James.	Houston & Texas Central.	2,154
McIlwain, J. D.	Western Div. Grand Trunk.	
McKenna, Robert.	Del., Lack. & Western.	2,146
McKenzie, J.	New York, Chicago & St. Louis.	6,746
McPherson, B.	Plint & Pere Marquette.	
McWood, William.	Grand Trunk.	
Manier, B. F.	Jones Car Mfg. Co.	
Marden, J. W.	Pittsburg.	2,225
Messner, D. M.	Pennsylvania.	
Milham, J. N.	New York, Lake Erie & Western.	
Miller, Robert.	Hudson Central.	10,905
Mosell, T. H.	Wagner Sleeping Car Co.	
Murray, S. W.	Milton Car Co.	
Nye, S. D.	Washington Iron Co.	
Olmstead, E. A.	N. Y. Central & Hudson River.	
Packard, J.	Baltimore & Ohio.	
Parker, Frederick.	Detroit, Grand Haven & Mil. R.	700
Parks, R. H.	St. Charles Car Mfg. Co.	
Peabody, D. B.	Illinois Central.	
Pendleton, M. M.	Seaboard & Roanoke.	

Phelps, B. N.	N. Y. Central & Hudson River.	
Potts, Robert.	Canada Southern.	
Pullman, A. B.	Pullman Palace Car Co.	
Ramseyer, W. H.	St. Louis City & Pacific.	
Raymond, J. H.	Western R. R. Association.	
Reilly, P.	New York, Ontario & Western.	1,375
Richardson, D. C.	Boston & Maine Railroad.	300
Richardson, Ed.	Shenandoah & Allegheny Railroad.	
Richardson, C. N.	St. Orleans & Texas Pacific.	
Robson, A. C.	Lake Shore & Michigan Southern.	
Rommel, Geo.	Wilmington & Northern.	153
Salvator, T. C.	St. Charles Car Mfg. Co.	
Sargent, Geo. M.	Minneapolis & St. Louis Railroad.	2,040
Seavers, T. L.	Central of Iowa.	
Short, W. A.	Wisconsin Central.	1,781
Smith, Peter.	N. Y. Central & Hudson River.	
Smith, W. O.	Lake Shore & Michigan Southern.	
Snow, W. B.	Illinois Central Railroad.	5,964
Snyder, H. F.	Pardee Car Works.	
Soule, R. H.	N. Y. West Shore & Buffalo.	2,000
Steinbrunner, G. H.	C. C. & C. & I.	
Stevens, S.	Old Colony.	
Sutherland, Thos.	Chicago & Grand Trunk.	2,234
Taylor, Joseph.	Michigan Car Co.	
Terry, J. C.	Central Support Car Truck Co.	
Titus, H. D.	South Carolina.	
Trainham, W. H.	Rich, Fred. & Potomac.	137
Townsend, Jos.	Chicago & Alton.	7,000
Vail, Allen.	Buffalo, N. Y. & Philadelphia.	5,891
Verbrück, B. K.	Chicago, Rock Island & Pacific.	7,760
Voelbe, J.	Southern Car Works.	
Wall, E. B.	Pittsburg, Cin. & St. Louis.	10,625
Warren, R.	Ind. Bloomington & Western.	
Watrous, Geo. C.	Detroit, Lansing & Northern.	1,000
Webster, H. A.	Manhattan Elevated.	
Welch, Benj.	Central Pacific.	
Wicks, J. H.	Merchants' Dispatch.	
Wilder, F. M.	N. Y., Lake Erie & Western.	29,000
Williams, C. C.	West Jersey.	264
Wicks, Casper.	Cumberland Valley.	402

PRESIDENT GAREY then delivered his annual address, in the course of which he said:

The progress made during the past few years toward cheap and rapid transportation by increasing the carrying capacity of freight cars from 10 to 20 tons per wheel, would it not be advisable to make such increase the extreme limit admissible by our rails and bridges? This would require an entire change in size and strength of material used. Before advocating such change we should learn how much of the freight offered could be loaded to the extent of 40 tons or more per car, without doubling their present size; what increase in the strength of wheels would be necessary, and what changes would be required at loading and terminal stations.

The present manner of warming passenger cars during the extreme cold weather in our Northern States is far from satisfactory. How to furnish heat without injury to passengers from fire, steam or hot water in case of accident, is one of the problems yet to be solved, and this invention have not as yet presented a device removing such liabilities, it is incumbent upon all master car-builders to study carefully how to arrange available heaters to obtain the best results in comfort and safety.

How to prevent accidents to trainmen while performing their duties has been a special study by some of our most experienced railroad men during the past few years with good results. If an automatic coupler, or one sufficiently so to prevent the necessity of trainmen standing between cars while in the act of coupling, could be put into use, it would be a simple and efficient train brake under the control of the engineer, and arranged so that it could be applied from any part of the train, they would remove many of the causes of accidents to men while handling cars, and at the same time allow the speed of our freight trains to be increased to the ordinary passenger train speed.

Some action should be taken to establish a standard form and size of iron for coupling links and pins, with inside dimensions for link, diameter and length of pin and quality of iron for these parts, so that simple and efficient and property, have occurred by the use of defective links and pins.

In preparing a list of the standards recommended by the association some errors were found which should be corrected. A committee should be appointed or the executive committee instructed to make corrections and submit them for your approval. I hope all master car-builders have given special attention during the past few months to the sealing of wheels to gauge on axles, and are prepared to recommend some system which can be put in operation at once in all of our shops, as the present improper manner in which it is done causes unnecessary expense in wheels and rails and power to move trains.

The rapidly increasing number of expensive refrigerator cars, which are liable to be overloaded with perishable freight requiring dispatch, are causing much trouble at interchange points and heavy expense in repairs. Most of such cars are not owned by the railroad companies, and the repairs ought to be provided for by the owners, as so much of their construction differs from cars in general use that special articles ought to be carried in stock to repair them.

He then spoke of the Exposition of Railway Appliances, and the enterprise and public spirit of the citizens of Chicago as displayed in its organization and successful completion, and concluded with an appropriate allusion to the recent deaths of Howard Fry and Alpheus Glosion, both of whom were members of the association, and had been prominently identified with its growth and usefulness.

Mr. M. N. FORNEY, the Secretary of the Association, then read his report, in which it was stated that there were 143 active members, 37 representative members, and 3 associate members, making a total membership of 183. The whole amount due from members to the association and remaining unpaid, was \$915. The prospective income to be derived from this year's assessment is estimated at \$2,115, and this, with the probable increase of membership, would make the revenue for next year about \$3,000, a sum sufficient for present needs. With respect to the work to be done by the Association in future, the Secretary says:

"Its sphere of action is at present necessarily limited. There are some things which it can do and others which its resources do not permit it to do. In a great measure it is an association of action of its members, or of the agencies they represent. With this in view, and in view of the unanimity of action of its members, and the fact that it is a question of relation to them. So long as these questions are comparatively simple and require no large amount of study, investigation or labor to arrive at some conclusions with reference to them, the association can act on them intelligently and wisely, but when much time, labor and thought must be given to any

subject before it can be ascertained what would be the best thing to do, the association is unable to command either the time or the ability of its members, or of any one else, which the investigation of such subjects requires. Thus, when a height of drawings was to be determined, nearly every member was prepared to consider the question intelligently, but if the association is asked, as it often has been of late, to recommend a standard self-coupler, it is helpless to command the time or services of competent persons to make the investigation which must be made before the association is in a position to act intelligently on such an important question. Its members are too busy to engage in the kind of researches which, if made, would be of very great value to railroad companies and to the community. The problem of how to have such work done is a very important one to the association and to railroads, but the difficulties in the way of doing it are great, and it should be kept in mind that most efforts in this direction have failed. The subject is referred to because this association is often expected to do what with its present resources it is utterly unable and unfitted to accomplish. Experimental research and original investigation in any field of mechanics requires ability of a very high order. Until the association can command the time, knowledge and the skill of persons competent to do such work, it must confine itself to the narrower field which it has heretofore occupied. There is now good reason for believing that in another year the finances of the association will permit it to make a small expenditure for experimental work. It will depend upon how this work is done whether railroad companies will be willing to contribute or provide for an increase of funds for that purpose.

Mr. FORNEY then announced, for the information of the Executive Committee, whose duty it was to appoint a Secretary for the ensuing year, that he should decline a reappointment, and stated his reasons therefor, which were of a personal nature.

From the returns made in reply to inquiries put forth, the committee are strongly of the opinion that this is by far the greatest cause of wear and tear.

2. Defects in construction or condition of trucks, among which may be enumerated the following:

A. Wheels of same axle of different diameter, either originally or after wear.

B. Wheels on same axle at unequal distances from the journal.

C. Wheels gauged too wide, whether by design or accident.

D. Trucks not square.

In regard to the prevention of sharp flanges, your committee would express the opinion that the curve at the angle of the rail should correspond to the curve of the flange, and your committee think this should be a radius of 4 inches. They also recommend that care be taken to correct all such defects.

In construction or condition of trucks.

Respectfully submitted, H. STANLEY GOODWIN, Chairman.

Mr. GOODWIN said that, in his opinion, the shape of the wheel should conform to the shape of the rail, and the rail should conform to the shape of the wheel.

He then said that the members to whom circulars had been sent all thought the radius should not be more than 4 inches. This should not come in contact with a rail having a radius of 4 inches, as it would cause a sharp flange.

Mr. DAVENPORT thought a prominent cause of sharp flanges was trucks being out of square. He knew from actual test that but very few trucks running under cars were square. In several instances he had found them to be 23 inches out of square, which would of necessity cause great wear of the flanges on one side. It also caused trains to haul hard, and locomotives to consume more fuel than was necessary. No car, in his make, were allowed to go out of their trucks out of square.

Mr. W. E. CHAMBERLAIN said that trucks 23 inches out of square was more than a truck could bear and not leave the track. Whoever sent out cars so constructed were responsible for wrecks.

Mr. HILDRUP thought that a good deal depended upon how the trucks were measured.

Mr. CHAMBERLAIN did not believe that all trucks were out of square, and did not want such an idea to be published. American master car-builders were not idiots. He thought there must be some mistake in the measurement.

Mr. DAVENPORT explained how his measurements were taken.

Mr. F. D. ADAMS inquired if all makes of trucks were equally out of square.

Mr. DAVENPORT replied that they were.

President GAREY then introduced Mr. Richard Williams, of Wednesday, England, an axle manufacturer, and asked for his views as to the cause of the flange wear.

Mr. WILLIAMS said that steel-tired wrought iron wheels wore to sharp flanges in his country, and that he was glad to meet American railroad men and discuss so vexatious a question. He also thought 23 inches variation from square to be impossible in a truck. If sharp flanges were caused by the shape of the rail, as has been claimed, all flanges must wear sharp instead of part of them, as now. A chilled wheel will angle by the brake upon it and will wear the rail. Sometimes wheels of different diameters were put on the same axle, when the smallest one will be pushed against the rail by the larger one. He held that no two sharp flanges could be found on the same axle. Of two wheels of the same size, one would wear sharp and the other not. Wheels should be measured carefully and put on at perfect right angles, and no trouble would ensue.

Mr. J. W. CLOUD said that after a truck had been run some time the brasses would wear one inch or more. No railroad sent their trucks out wrongly constructed at first, and he considered it a waste of time to discuss the matter further.

Mr. H. S. GOODWIN here said that wheels wear in the boxes, and that a diamond track would in time make a soft softer than another of the same make.

Mr. C. BLACKALL claimed that a round top rail would cause more sharp flanges than a square top.

Mr. ADAMS made a protest against roads using wheels of different diameters on the same car, and said that he had known a Boston & Albany car to come home from a foreign road with wheels on it varying 1 1/2 inches in diameter. Another case varied 1 1/4 inches. His road never allowed a great variation between the wheels.

He wanted Western roads to be more careful.







iron spoke wheels with steel tires which had run 30 years were found to be hard to break up, so great was their tenacity. Mr. Williams predicted that chilled wheels would be abandoned in this country before many years. The greatest trouble was the fight with vested interests. In his country chilled wheels were used almost exclusively for passenger equipment and 36 to 38-inch under freight cars.

Mr. GOODWIN asked what elasticity English wheels had, and Mr. Williams replied that spoke wheels must be elastic.

Mr. ADAMS said that his road had no fault to find with the 33-inch English wheels which they had used. None of them had cracked in use, as had been reported.

Mr. McWOOD said that but two of them had given him trouble, and those were caused by defective welds in the wrought center.

Mr. FORNEY said that the English board of trade report, a most comprehensive report on the causes of all railroad accidents, gave but one instance of a wheel failure in the whole United Kingdom during the last year.

Mr. BISSELL asked if a plate wheel of wrought iron had the same elasticity as a spoke wheel.

Mr. WILLIAMS said that spoke wheels were the easiest riding. The English passenger coaches were lighter than American ones, but the freight load was from 6 to 10 tons. English tires were but two inches thick, while American ones were three inches. The English tires were five inches wide, while the American tires were 9 1/2 inches.

The Treasurer of the Association presented his report for the past year as follows:

RECEIPTS.	
Balance on hand June 12	\$383.57
Received members' dues from C. J. Smith	81.57
Received from Mr. Adams, dues from members	69.00
Received from Railroad Gazette	3.00
Balance due treasurer	66.28
Total	\$1,536.30
EXPENSES.	
Paid Pratt & Whitney for standards	\$225.00
Paid Mr. Forney balance of bill	30.00
Paid for reports	148.70
Paid for legal services	132.00
Paid Railroad Gazette for printing	207.32
Paid for printing reports	250.00
Paid Mr. Forney for paper	79.83
Paid for postage	15.00
Paid K. L. Story for reading proof	15.00
Paid for having wrappers addressed	1.00
Paid for printing circulars	42.75
Paid for printing and stationery	57.75
Paid for postage	41.37
Paid Secretary Forney for services and expenses	333.33
Total	\$1,536.30

The late Howard Fry, having been the chairman of the committee on Brake Shoes, Brake Beams, etc., no report was forthcoming, and the committee was continued.

#### REPORT OF COMMITTEE ON STANDARD FREIGHT AND PASSENGER CAR TRUCKS.

To the Master Car-Builders' Association: The committee on standard freight and passenger car trucks are unable to make a final report, and this report relates to freight trucks only.

The recent changes in the methods of freight traffic in the direction of heavier loads and higher speeds have shown the necessity of a truck different from any now existing. We are just now experiencing a revolution in truck construction, and it is probable that the next year will develop more improvements than have been made in the last eight or ten years. It is not yet time, therefore, for this association to decide upon a standard freight truck, and the best work your committee can do is to indicate the improvements which modern freight traffic demand for this part of a car, and to note carefully the progress which this difficult task makes in the discussion of this report.

1. The required strength of the truck depends upon the decision as to what is the most economical capacity of a freight car, and also what is the most economical speed for freight trains, for it is possible the freight may be carried as cheaply by increasing the speed of trains as by increasing the capacity of the car. A standard truck can only be recommended or adopted until the load which determines its position is decided.

2. Shall the standard truck have a swing bolster or a rigid one? Car-builders are not entirely united in recognizing the advantages of the swing bolster. It may be stated as a general rule that all roads which have used them to any extent prefer them to the fixed centers. Many car-builders who use the rigid center believe in the merits of the swing bolster, while others do not think it necessary.

This is a proper question for the association to discuss, and it should have special attention in the discussion of this report. The advantages claimed for the swing bolster are: (1) Less resistance on the rail, (2) less pressure to both truck and car body, (3) less injury to the rail.

3. The standard truck should have the brake beams situated between the wheels, and suspended from some part of the truck which makes a fixed distance from the rail.

4. The design should be such as will admit of the use of automatic train brakes.

5. There should be few parts, simple in shape, and so constructed as to be easily removed for repair.

6. The material should be iron or steel.

The committee are indebted to the members who replied to their circular for valuable opinions and suggestions which have been embodied in the report.

They hope that the discussion of the points here presented will make the requirements of the standard truck so clear and definite that it will not be difficult to design it, and that at the next meeting they may be able to present a design worthy of your consideration.

ROBERT MILLER, Chairman.

A letter which had been received by the committee from Mr. Geo. Westinghouse, Jr., on the substitution of iron for wooden running gear, was then read, in which he favors hanging brakes between the wheels, and also a journal 5-in. diameter by 9 or 10 in. in length.

Opening the discussion on standard freight and passenger car trucks, Mr. HILDRUP spoke at length, saying that the subject was unlimited. We have no standard truck; there are no nearer one than we were forty years ago. It is now each road for itself. Forty years ago five sticks of timber and four sleeves made a truck. An iron truck was even made in that year by W. E. Ray. All trucks have their defects. Who shall say that there exists a truck worthy to be a standard? Trucks out of square are bad for a curve and complicate things a good deal. The New York Central used a truck with an auxiliary bar to keep it square, but this was unreliable on account of the welding at the axle. He concluded that we could not build a truck that would keep square. The only improvements had been made in the work and the use of better material. This showed our progress. Swinging bolsters may have advantages, but on the other the center goes to the inside with a leverage of one to two inches to crowd the rail and complicate difficulties. We can not to-day select a satisfactory truck. There have been improvements in axles and journals and in many things, but none in trucks. With the prevailing system can we trust a car keeping level to judicious loading? No, we can't depend on the loaders. He saw a model at the South, which seemed to him to be the coming truck. It was the "suspension truck" with pendulum motion, instead of a rigid sliding motion. With a car resting on a center plate when a curve is reached the car goes one way and the truck an-

other. He would ask the attention of all to the suspension truck.

Mr. W. E. CHAMBERLAIN, of the Providence & Worcester road, said that he had the suspension truck under six 20-ton coal cars which had run daily nine months in the year, and that he would not wear in comparison with the common truck. No other wear on the brasses and journals. He favored the suspension truck.

Mr. F. D. ADAMS was surprised that Mr. Westinghouse should advocate a 5 1/2 or 10 inch axle. When the master car-builders' axle, 3 1/2 inch, was adopted many would not use it at first. Now the call was for large axles. He thought that the suspension truck was the coming standard. His road officers favored it. These trucks ran so steadily that trainmen would pick out cars having them to ride on. He would inquire what Mr. Chamberlain had said. After a 25,000-mile run the brasses were not worn. He would vote to-day to make the suspension truck the standard from gauges and templates. His road had just ordered 50 sets of them.

Mr. HILDRUP did not favor a swing bolster. Mr. BISSELL thought that on the suspension truck the suspending-rods would get slanting on a curve and wheels press the outside rail. It could not be avoided.

Mr. CHAMBERLAIN thought that the suspension truck helped to bind the inside rail of a curve.

Mr. WALL said that as the suspension truck seemed about to be adopted and to be getting prominent, he would move that a committee wait on the Suspension Car Truck Company and get them to make a standard, to be brought before the committee next year.

Mr. ADAMS said there are several kinds of these trucks, and we want a standard.

Mr. BISSELL favored the suspension or pendulum motion in a truck.

Mr. CLOUD thought that too much prominence was being given to a new thing. A truck lasted 12 to 15 years. Most of them were worn out before they were brought in another year. Let us not be rash, but discuss what is required in a standard truck. We represent too much money to act hastily. The truck might be good for all he knew, but he had not yet had a long trial. He would make an amendment to refer to the executive committee.

Mr. HILDRUP said that as the convention could not harmonize on any of the old trucks, why not take a new one. It could not be chosen all at once.

Mr. ADAMS thought that the standard truck would prevent long tentacles of cars for repairs. He would have the executive committee confer with the Suspension Truck Company.

Mr. J. H. RAYMOND wanted the suspension truck to be uniform if adopted.

It was finally voted that the executive committee should confer with the Suspension Truck Company.

Mr. CLOUD thought that the suspension truck might be more developed yet. Cars must be attached to trucks by a flexible connection. He would call attention to the strain on the connection. Let us have more experience in the suspension truck.

Mr. MARDEN had studied the suspension truck for two years, and had them in use on a caboose and also under milk cars. The only trouble was a side bearing movement. We need more strength in side bearings. When a car is on a curve the link gets out of line, and when the car gets straight again they (the links) must raise the car load to get perpendicular again.

#### REPORT OF COMMITTEE ON CAUSES OF ACCIDENTS TO TRAIN AND YARD MEN.

To the Master Car-Builders' Association: Your committee, appointed to ascertain the causes of accidents to train and yard men, beg to report that they issued a circular to the various car-builders and others connected with this association bearing on this subject, to which they received only 13 replies.

In reviewing these replies, together with such other information as could be gleaned, your committee find that little more can be said than what has already been reported by former committees. Nevertheless, your committee are of opinion that the following suggestions are worthy of your consideration.

Indorsing the report of the committee at the sixteenth annual meeting, your committee considers the subject of dead-woods a very important factor for the protection of trainmen as well as property, and as there are two kinds in use, viz: single and double dead-woods, we are of opinion that the single dead-woods are used they measure not more than 30 inches from out to out, each block to be 10 inches long by 8 inches wide, and where the single block is used, must be not less than 28 inches long by 7 inches thick. Such facts, thus preventing the single dead-wood on one car from passing between the double dead-wood on the next car, which is a common occurrence with the cars in use at the present day and to a great extent accountable for the injuries sustained by train and yard men.

Your committee should also urge that the steps bolted to the sills at the corners of the car be made of 1 1/2 inch iron, and that where the ladders are on the end of the car, a handle be placed horizontally, about 24 inches above the lower edge of sill on side of car above the steps, also when the ladder is on end of car a handle should be placed on opposite corner from the ladder, and when ladders are on side of car two such handles should be placed on each end of car about 24 inches above bottom of sill, thus enabling train and yard men to sustain themselves while making couplings, and vastly beneficial should they stumble or otherwise lose their footing. This, although recommended in 1870 and repeated in 1882, has been entirely ignored. It was also repeatedly recommended in the answers to circulars from this committee.

Your committee would also recommend in the construction of freight cars that the draw-bars be of a uniform height, notwithstanding the patterns are different. We have not as yet seen an automatic coupler that we would feel justified in recommending to the association, as in most cases they are very complicated and easily damaged, making them expensive to construct and keep in repair, and in most cases impracticable. Among the suggestions received by your committee, the following are deemed worthy of presentation for discussion, feeling that much more can be elicited and explained at the meeting than in this manner, viz:

1. Uniformity in dimensions and location of dead-woods.
2. Handles at the end of car for making couplings.
3. The end handle of the car, instead of two, to aid in making couplings and mounting car.
4. The end handle of the car, instead of two, to aid in getting the car coupled between the rails.
5. End platforms and double dead-woods on all freight cars.
6. Carefully-constructed and properly-kept running boards, steps, ladders, brake-steps, pawls and brake-wheels, cars to be rejected by connecting links if not in perfect condition or so worn as to give a time.

W. F. TURNER, Chairman.

Mr. KIRBY claimed that the reports of the committees on these matters had never been heeded. Nowadays, owing to the existence of car trucks and kindred bodies, the responsibility was partly removed from the master car-builders. Horizontal handles should be placed on the end of each car for yardmen to take hold of while coupling.

At this point Mr. KIRBY presented a case as to the size, location and number of dead-woods, in which many took part, several speaking at a time.

Mr. GOODWIN wanted the handles placed as desired by Mr. KIRBY.

Mr. KIRBY considered 28 inches sufficient.

Mr. MARDEN favored double dead-woods of 30 inches.

Mr. ADAMS said that new cars, especially those built by some western builders, became dangerous in a few weeks. One of these he had noticed had the step-rods of the iron ladders bent over and hooked into soft wood at one end and the other end fastened with a lag screw. Sometimes the brake-wheels come off. He had been instructed to receive no more such cars.

Mr. FORNEY moved that a committee be appointed to prepare a circular calling the attention of railroad managers to the standards and appliances for the safety of trainmen which have been recommended by the association, which was agreed to.

Mr. WALL moved that the executive committee be instructed to revise the resolution relating to the recommendation of standards and to report to the next annual meeting what action, if any, is required to correct existing errors and discrepancies in the previous action of this association. Agreed to.

Mr. GOODWIN said that at the last year's convention the length of dead-blocks was made not less than 28 inches. He would move to amend that and strike out the words not less than. Then he would move to change the 28 to 30, having it referred to members by letter ballot. These two motions of Mr. Wall and Mr. Goodwin produced much discussion on dead-blocks. Some did not wish that standard adopted at Philadelphia to be changed, and others claimed that the standard adopted there was not adopted intelligently. Mr. Goodwin's motion was passed, and also a subsequent motion that the size, dimensions and conditions of dead-woods be put to letter ballot, and whether they be double or single.

The report of the Committee of Conference with the Car Builders' Association, in reference to the system of making cars of fast freight lines, was then presented and read, the committee recommending that the subject be brought to the attention of all active and representative members of the association by special circular, and that each member be furnished with a large number of circulars asking for replies to the following questions:

1. Is the freight car greater than the loads they carry have been increased, and if it is of opinion that the cost has increased, in your opinion, if car axles are made of a single piece material, what should be the length and diameter of the journals, and the diameter of the axle ends, carrying loads of 5,000 pounds per wheel safety, and should their dimensions be for carrying 7,500 pounds, and what for carrying 10,000 pounds of load per wheel?
2. Do you think it would be economical to construct cars specially designed for carrying more loads than the loads they carry now, and if so, state what you think the capacity of such cars should be?
3. In your opinion, if car axles are made of a single piece material, what should be the length and diameter of the journals, and the diameter of the axle ends, carrying loads of 5,000 pounds per wheel safety, and should their dimensions be for carrying 7,500 pounds, and what for carrying 10,000 pounds of load per wheel?
4. Give any facts which may have come under your observation which would lead you to believe that the axles have been either too small or too large for the loads they carried.

The Master Car-Builders' Association had occasion to recommend a standard axle at the next meeting, and were free to adopt what seemed to be the very best, would you like to be made to take axle larger than are required for safety, or is safety the only practical consideration to be taken in their design and construction?

What has been your experience, during the past severe winter, in repairing broken axles in freight cars? Have you had any cases where the wheels were small or large axle which broke? Have axles failed more frequently than in the past winter?

First Question.—It is the opinion of a large majority of those who have sent replies to the committee's circular that the cost of repairs to freight cars has been increased to a considerable degree, but none of them have sufficient data so to give what proportion the cost of repairs have been in proportion to the loads carried.

Your committee can see no way whereby the car department could possess that information; only from the books of the freight department could it be known. For example, the actual weight carried and weights as shown by the way-bills do not always agree.

Second Question.—All the replies to the circular, 4,500 pounds of load, not including the car, is all that should be put upon the present M. C. B. axles, and also the present construction of freight cars. It is a little safer in this connection. (1) The imperfect mode of lubrication, (2) the carrying capacity of bridges and tracks, (3) the tendency to increase the speed of freight trains. All combined make them very cautious as to the increase of carrying capacity to recommend.

Third Question.—Two are of the opinion that journals 3 1/2 inches are large enough for 5,000 pounds of load not including the car. Six say that they consider 5,000 pounds of load enough for the axle, and for carrying heavier loads than 5,000 pounds per journal is not prepared to recommend the proper dimensions. The majority think that for loads of 7,000 pounds per wheel the dimensions of axles should be increased. Journals should be 4 1/2 inches. One says that for loads of 7,000 lbs. per journal the journal should be 4 1/2 inches. Two recommend these dimensions. One of the persons replying says that he has no data, but that he is inclined to believe that a 4 1/2 inch axle is better than a 3 1/2 inch axle.

Fourth Question.—Several instances could be cited where journals have broken under a load, but in nearly every case the load has been 5,000 pounds or more on a journal only 3 1/2 inches.

Fifth Question.—If any change should be made, two would favor the journals to be 4 1/2 inches. One would favor an increase, but does not say how much. Two think that for a 40,000 pounds load, the present M. C. B. axle is sufficient, the wheel diameter being 33 inches.

Sixth Question.—One does not think it policy to make axles larger than are required for safety, that being the only practical consideration. The majority are of the opinion that a large factor of safety is economical inasmuch as it is safe. Cases are cited where the breaking of an axle has caused damage amounting to several thousand dollars.

Seventh Question.—One says that his road has had no broken axles the past winter. One has had but few broken axles under frequent equipment cars the past winter. Those that have broken have generally been small in journal and wheel fit. One has had but one M. C. B. axle break, and that was not properly welded. Replies to the questions sent out by this committee in their circular have not been very numerous and furnishing but little information. The fact is, we think that but very few master car-builders possess the knowledge so as to determine just what the dimensions of the journal and what the size of wheel fit to safely carry a given load should be.

It is the opinion of your committee that the dimensions of the journals and wheel seats of M. C. B. axles are sufficiently large for loads of 5,000 pounds. They think that the middle of the axle should be increased to not less than 4 inches diameter when 33-inch wheels are used. There are considered too much of the journal and wheel seat of the freight cars besides the axle. The experience of last winter has demonstrated that the master car-builders' axle is the strongest part of freight car trucks as generally constructed.

Your committee regrets that so little information has been obtained. This may be attributed, perhaps, to a want of more time to give the members of the association the opportunity to express their views, or to the fact that the necessary information so as to make this a full and complete report.

We would suggest that the committee be continued at a new one appointed, and master car-builders and others give their experience more fully.

JOHN KIRBY, Chairman.

Mr. KIRBY, of the committee said that but few replies had been received to the letters of the committee.

At this point Mr. KIRBY presented a case as to the limit, as no 33-foot car would haul much over 40,000 pounds, except of pig iron or lead.

Mr. KIRBY said that some cars were built 38 feet long in the past.

Mr. WALL.—We must increase the capacity of our cars as fast as our road-beds and bridges will bear it. It is not safe to run two 30,000-pound cars coupled together, as the weight is not distributed.



## REPORT OF COMMITTEE ON DECORATION AND FURNISHING PASSENGER CARS.

## To the Master Car-Builders' Association.

Your Committee, appointed at the last annual meeting to report on the Decoration and Furnishing of Passenger Cars, with instructions to indicate the principles which should govern the interior and exterior decoration of passenger cars, and how both it and the comfort of cars may be improved, beg leave to report.

In treating the subject of furnishing and decoration of passenger cars, we do not intend to enter into detail as to each extent with each particular part necessary to the construction of a first-class passenger car, as the subject is too comprehensive to be embodied in a report of this character. The workings of the instructions to the committee does not limit the latitude of our duties, and we take it that it is the intention that we should speak of all important parts necessary for the safety and comfort of the passenger. As good trucks are indispensable to both safety and comfort, great care should be exercised in the size and quality of axles, finish of journals, mating or pairing of wheels, exactness in pressing to gauge and equal distance from journals, quality of journal bearings, quality and uniformity of castings, a careful adjustment of springs to weight to be carried, and exactness in all the details of construction.

As the platform and brakes now in general use seem to give maximum of satisfaction for safety and comfort, we have no improvement to suggest.

We now come to the superstructure or body of the car, on which a great deal might be said, but we will mention but a few points. As utility is of first importance, proper care should be exercised to produce great strength to insure safety and durability. Keeping in view symmetry of outline, plain and neat style of finish, with a little decoration, will, in our opinion, produce the best results.

**Interior.**—As the interior of the car is the home of the traveler, all of its appointments should be designed with a view to make it comfortable, attractive, and thus ameliorate the tedium of journey. In order to accomplish this result, good seating, and warming, and ventilation, two clean saloons, pure cool water and commodious lavatory, are all necessary adjuncts.

**Seating.**—As the various designs adopted by first-class roads are quite satisfactory, we refrain from mentioning any particular style.

**Heating.**—The principle of placing pipes under the seats, supplied with steam or hot water, is well known, and is the best method of heating. It gives most satisfactory results. At times, in this and higher latitudes, this system does not come up to the mark. To meet this contingency, we recommend double windows, the inner sash movable, to be taken out in summer.

**Ventilation.**—One of the most satisfactory now in use is produced by pivoting the deck sash and transom sash over end doors. To prevent cinders from blowing in, the car should be placed in a brass wire cloth outside of deck sash.

**Saloons.**—Should be well ventilated and good seats and supplied with ventilated pipes and ventilated urinals; and for the covering of the floor of saloon use a sheet copper about 22 gauge, fastening down same by nails through a ledge turned up about 1/2 in., but no joints or nails or screws in the floor surface. All drip-pipes and pans should be porcelain.

**Water.**—A liberal supply of pure cool water should be kept in the cockpit, easily accessible to all persons in the car, but suitable lavatory is a convenience that modern travel is entitled to, and necessary to make up the maximum of comfort, especially in long journeys.

**Finish of Interior.**—In the construction of the interior of the car, of like character are used, we should suggest using but one kind of wood for the entire interior, in order to give a uniform appearance. If mixed woods are used, we would suggest those woods that have mild contrasts in color, as they give the most pleasing effect. As to the material, modern travel is entitled to, and necessary to make up the maximum of comfort, especially in long journeys. As to the material, modern travel is entitled to, and necessary to make up the maximum of comfort, especially in long journeys. As to the material, modern travel is entitled to, and necessary to make up the maximum of comfort, especially in long journeys.

T. A. BISSILL, Chairman.

## REPORT OF COMMITTEE ON HEATING CARS.

## To the Master Car-Builders' Association.

Your Committee, appointed at the last regular convention to investigate and report as to what are the elements of safety, economy and comfort in the various methods of heating cars, respectfully submit the following report for your consideration.

Letters of inquiry were sent out to thirty of the most prominent roads in the country, asking for information on this subject, and there were answers received from eighteen, as follows: Six in favor of the Baker & Smith Heater, four in favor of Johnson Heater, two in favor of the Briggs Heater, and two in favor of the Searles Heater.

There is no doubt that there has been considerable improvement made in heating or warming cars within the last six or eight years. Still, from the reports your committee has received, there would seem to be objectionable features to nearly all the above-named appliances for warming cars, and it is not probable that they will be so improved as to be up to anything like good working order; others are easily damaged, and are liable to get out of order.

We are glad to say, however, that the old system of stove-heating, rendering one part of car uncomfortably cold, and the other part uncomfortably hot, and the danger of fire, has been much improved, where steam or hot water heaters have been placed in use in place of the common coal or wood stove.

You will notice that there are three very important requirements in heating passenger cars, and these are safety, economy and comfort. Your committee, after giving the matter a very careful investigation, is of the opinion that to obtain safety and economy is the desirable thing, and that heater should be placed outside of the car.

All stoves or heaters placed inside of the car are decidedly objectionable, from the fact that they are liable to catch fire, and the gas and the smoke from the same make it desirable, to say the least, to get rid of them from the inside of the car, and the room taken up and occupied by the stove or heater is of too much value to be wasted, if any form of heater is successfully devised that will heat the car and warm the car from the outside, and thus render an inside stove unnecessary.

Your Committee has been informed that on the Reading Railroad there is in use a hot-air heater placed outside under the car, but it has been reported that in very cold weather it has been found necessary to double place all the windows in the car in order to keep the car sufficiently warm.

Your Committee is of the opinion that steam in all cases is much preferable for heating cars on account of its rapid circulation and the ease with which it could be controlled to suit the varied changes in the weather.

In case of derailment or collision safety demands the heater to be placed outside of the car. Your Committee would not feel warranted at this time to recommend any one particular heater, but would recommend that, if found practicable, cars should be heated from the outside.

J. N. MILLHAM, Chairman.

The following resolution, proposed by Mr. LEANDER GARREY was adopted:

"Whereas, It is a common practice to store line cars on side tracks during summer months or dull times away from home after they have been used in service; and

"Whereas, Many of the cars after being so stored are found to be more or less out of proper condition, so that they need more or less repairs, and when put into service cause much detention to traffic and many transfers;

"It is resolved, therefore, That it is the sense of this meeting that all line cars owned by our own companies should be returned to their owners instead of being stored on foreign tracks, and that a competent man should be detailed to inspect the stored cars and to arrange to have the necessary repairs made during the term such cars are out of service."

It was agreed that the Committee on Subjects should be allowed to make its report to the Executive Committee.

Mr. GOODWIN offered the following, which was agreed to:

"Resolved, That a committee of seven be appointed, representing the largest car owning roads who send members or representatives to the Master Car-Builders' Convention, and committee to confer with and if possible agree upon a standard home car with details of all parts, whose maximum load shall be 60,000 lbs., said committee to report to the Executive Committee, the Executive Committee, when ready to report, to send a copy of the report to each member of the Association for examination. The Executive Committee to report at next annual meeting."

The officers of the Association chosen last fall at the Niagara meeting were re-elected, with the exception of W. J. Christopher, who resigned as member of the Executive Committee. Mr. Thos. A. Bissell was appointed in Mr. Christopher's place.

Saratoga Springs was selected as the place of meeting next year.

The Convention then adjourned.

Mr. M. N. FORNEY was reappointed Secretary of the Association by the Executive Committee, at a salary of \$1,000 a year.

[The Committee on Refrigerator Cars made a lengthy report which, with the brief discussion upon it, will be published in our next issue.]

## RECEPTION AND ENTERTAINMENT.

We give below the programme of reception and entertainment as arranged by the General Reception Committee, regretting that we can not reproduce in our columns the tasteful and beautiful car original, with its appropriate representation of railway car traveling around the equatorial zone of the earth.

**Tuesday, June 12.**—Carriages for drives to parks and through the city. Visit National Exposition of Railway Appliances.

**Wednesday, June 13.**—Carriages for drives through parks, etc. Theatre in the evening.

**Thursday, June 14.**—Carriages for drives to parks, etc. Visit to National Exposition of Railway Appliances.

**Friday, June 15.**—Excursion by steamer, carriages leave Grand Pacific Hotel 9 to 9:30 A. M. steamer will leave Goodrich dock at 10 A. M. sharp, visiting water-works crib and landing at South Chicago. Lunch at South Chicago, thence to Pullman Car Works and Allen Paper Car Wheel Works, by rail. Banquet in Arcade Building, Pullman, 4:30 P. M. Exhibition by Pullman Athletic Club after banquet. Return by complimentary train directed by Illinois Central Railroad Co., leaving Pullman at 9:25 P. M.

## SUB-COMMITTEES.

**Executive Committee.**—E. S. Alexander, Chairman; W. S. Brewster, Secretary; A. B. Pullman, Geo. W. Morris, J. Hall Dow, W. H. Shaddock, Wm. J. Watson, Jno. S. Brewer, A. M. Gilbert, E. H. Talbot, Morris Alexander, George M. Sargent, E. S. Shephard, J. F. Wear.

**Finance Committee.**—Jno. G. Brewer, Chairman; Geo. M. Sargent, G. W. P. Atkinson, E. S. Alexander, F. K. Bows, A. L. Butler, Kosuth H. Bell, E. S. Shephard, Willard A. Smith, F. E. Walker.

**Locomotive Committee.**—Geo. M. Sargent, Chairman; Thos. A. Griffin, Geo. W. Morris, A. L. Butler, J. S. Toppam.

**Entertainment Committee.**—Geo. W. Morris, Chairman; W. J. Watson, Wm. A. Angell, Geo. M. Bogan, Archibald Winge, Geo. M. Sargent.

## Master Mechanics' Association.

The sixteenth annual convention of the Association was held at the Grand Pacific Hotel, in Chicago, beginning on the 19th of June. The convention was called to order by the President, Mr. Reuben Wells, of the Louisville & Nashville road. Mayor Harrison, of Chicago, made an address of welcome.

The roll was then called and 85 members answered to their names; 32 new members then joined the Association, making the total number of members present 137.

PRESIDENT WELLS then addressed the convention, briefly referring to the origin and progress of the Association and the benefits that had resulted from its annual meetings. He then called attention to the subjects of valve motion, economy in the cost of labor and materials, the thickness of pistons and flanges in large cylinders, the wear and durability of wheels and rails, the forms of wheel flanges and treads, the importance of uniformity in the diameter of wheels of a given size, the cost of fuel, an improvement in the quality of water for boiler use and the need of a reliable brake for freight engines and cars; and concluded by announcing the deaths of S. J. Hayes, John E. Martin and Howard Fry, late members of the Association, and recommending suitable action in relation thereto.

The secretary, Mr. J. H. Setchel, presented his report, which states that since the last annual meeting 26 members had resigned, and the names of 15 had been stricken from the roll for non-payment of dues. There had also been three deaths—Messrs. Hayes, Fry and Martin; 24 new members had joined the Association, making the total membership 137. The excess of receipts over expenditures during the year is \$304.62, and the principal and unapplied interest of the Boston Fund amounts to \$5,083.33.

An elaborate paper by F. W. Dean, on Locomotive Improvement, was read, and a long discussion followed. A paper was also read on Premiums to Locomotive Engineers, and reports made by the committees on boiler construction, spark arresters and extended smoke boxes, all of which were discussed. These documents are all of them unusually interesting and valuable, but their length precludes their publication in our columns.

## Costly Woods.

The finest and most costly of the veneer woods is French walnut—a wood that does not come from France, but from Persia and Asia Minor. The tree is crooked and dwarfed, and is solely valuable for the burls that can be obtained from it. These are large tough excrescences, growing upon the trunk. In this the grain is twisted into the most singular and complicated figures. The intricacy of these figures, combined with their symmetry, is one of the elements that determines the values of the burl. Color and soundness are other elements of value, which varies very widely. Burls worth from \$500 to \$1,000 each are not rare, and at the Paris Exposition for 1878, one burl weighing 2 200 pounds was sold for \$5,000, or upwards of two dollars a pound.

In buying burls much care is necessary to guard against fraud. Often decay and malformation results in leaving hollows in the very center, which, of course, greatly lessens the value. These hollow places are sometimes filled by fraudulent dealers with substances resembling the wood, and the whole is sold at a very much higher price

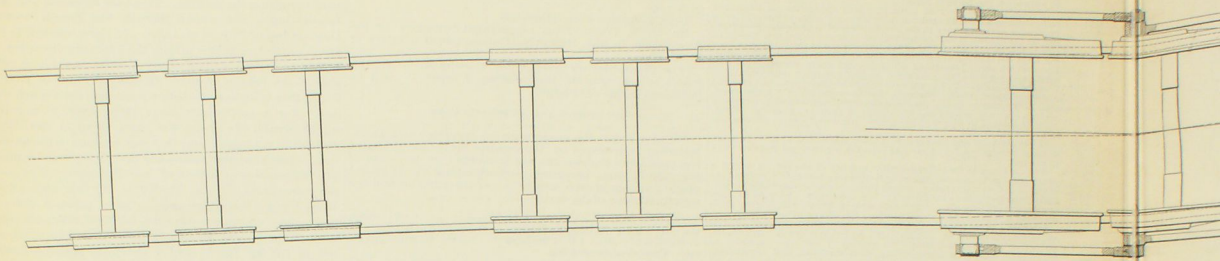
than it is worth. Compressed manure is one of the materials used for this purpose. An even worse fraud than this is that of placing stones in the hollows to increase the weight and thereby enhance the value of the burl. This not only cheats the buyer, but is liable to ruin the valuable knives used in cutting the veneers. There are rosewood and mahogany burls, but, unlike those of the French walnut, they are but of little or no value. In those woods it is the trunk of the tree that is prized; the knots are discarded.

Next to French walnut, ebony is probably the most valuable of the cabinet woods. Occasionally a fine piece is found that brings even a better price than the French walnut. For a particularly large piece, even \$5 a pound might be paid. In ebony the main thing is size. It is difficult to get large pieces that can be used without cutting. Rosewood and mahogany are always in demand. The best mahogany is that of San Domingo. Next come the mahoganies of Cuba, Honduras, Mexico and Africa. There is much less difference in value between different mahoganies and rosewoods than between different specimens of ebony and French walnut. Fair rosewood will sell in the log for 51 and 7 cents per pound.—*Lumber World.*

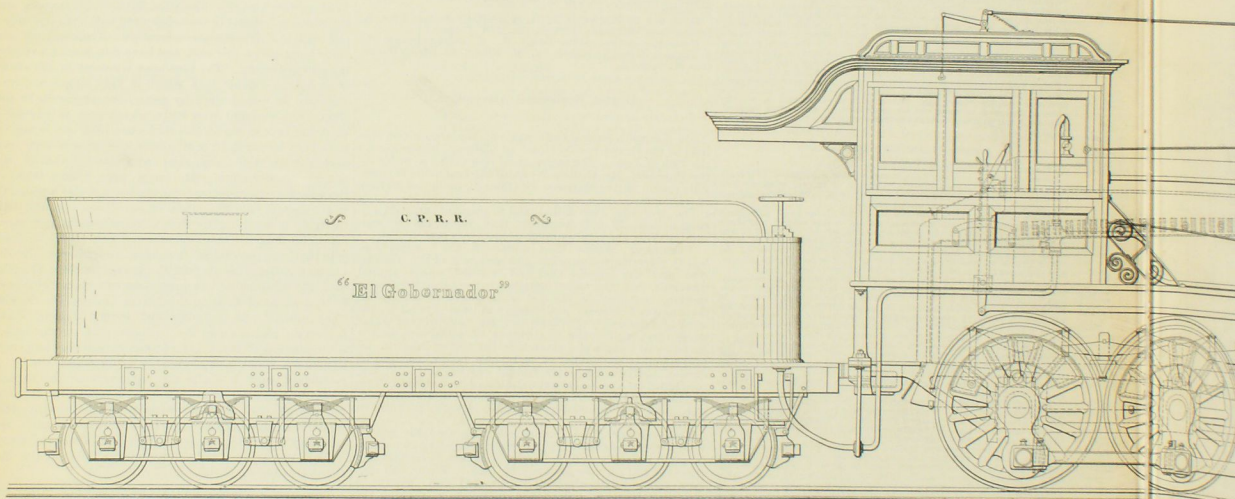
At the Chicago shops of the Illinois Central 50 fruit cars are being rebuilt from designs of Mr. W. B. Snow, the master car builder of the road. The cars are 234 feet in length, have inside and outside doors, and are ventilated from the ends and sides. Mr. Snow is also building 50 refrigerator cars, 50 twenty-ton coal cars, and 4 suburban smoking cars; 15 passenger coaches are in for repainting and overhauling. The suburban passenger traffic of the road is large and requires a special car equipment. These cars weigh 29,000 pounds and seat 40 passengers each. The seats at each end run along the sides and are placed crosswise at the center, like those in the cars of the New York elevated roads. The cars have Searles heaters, and the inside is finished in mahogany and oak, with decorated oak ceilings. There is also a lavatory. The smoking cars carry luggage at one end, and have side doors for receiving and delivering. The ventilator windows in the clear-story have a ratchet lock which is very simple and convenient. It was devised by one of the employees in the shop. The wrought iron body-bolster, now so generally used, has been in use on this road since 1852, and is said to have been invented by a Mr. French, who was then connected with the road, and who also invented the concave center-plate. Mr. Snow uses brakes between the wheels of his passenger car trucks, and also a pedestal-jack weighing only 95 pounds, on his 23-ton coaches. Although it is much lighter than those in general use, there are no breakages in consequence, and this seems to indicate that any additional weight is superfluous. In the locomotive department, four Mogul engines, 18 x 24 cylinders, are being built. Six engines for suburban trains have lately been received from the Rogers Locomotive Works. They have 16 x 24 cylinders and 48-inch drivers. Both drivers are placed under the cylinder part of the boiler, switching engine style. The frames extend back and carry the tender, which is supported by a four-wheel truck. A two-wheel truck is under the front end of the engine. These engines are said to have been designed by the late Mr. S. J. Hayes. Mr. Snow faces Miller-hooks with steel, which is easily removed when repairs are necessary. The company is building 100 twenty-ton coal cars at the Water Valley (Miss.) shops, and also the same number at the McComb City (Miss.) shops.

The Albany Evening Journal, in describing three cars recently constructed at the West Albany car shops, which are to be used on fast express trains between New York and Chicago, says: The length of the new cars is 56 feet. In them is combined a parlor coach, smoking section, and baggage van. The portion set apart for the occupancy of the passengers has a novel interior. It is fitted up in mahogany, with Georgia pine flooring and ceiling of decorated oak. As one enters the door he encounters several of the ordinary seats running through the center of the car. The backs and seats of the cushions are concave, and are so arranged that they can be tilted to an easy angle. They are four inches further apart than those in an ordinary passenger coach, thus giving ample room for stretching. Back of these seats, on the right hand, are ranged double revolving sofas four feet long. They resemble the ordinary car seat, except that they are cut in two parts and can be worked back and forth separately. The occupant of one-half faces one way, and that of the other half in the opposite direction. The width of these seats throws the aisle in the left side, an aisle intervening between a row of the ordinary revolving drawing-room chairs. Where the aisle diverges on either side of the car is placed a large beveled-edge mirror on a brass standard. Between every other seat fixtures are provided for tables, to be used for lunch, cards, etc. At the rear end of the seats is arranged a wash-stand with marble top and other toilet equipments. The space between the passenger compartment and that used for baggage is fitted up on one side with a Searle safety car-heater, lately adopted by the road, and a water closet. The baggage-room is finished in ash. One of these cars will be attached to each train for the special accommodation of gentlemen who smoke and desire to be apart from the other passengers. The new cars are numbered 651, 652 and 653.



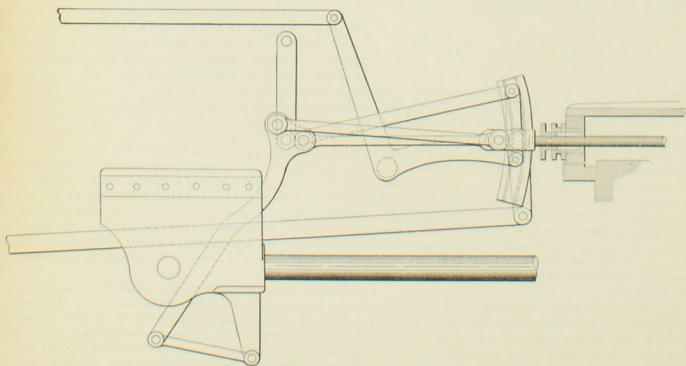


PLAN SHOWING ENGINE WHEELS ON 12° CURVE. RAILS

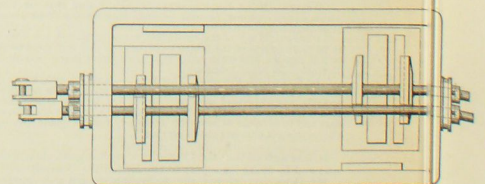


CENTRAL PACIFIC RAILROAD TEN-WHEEL CONNECTED FREIGHT CAR

Now Building at the Shops of the Road, at Sacramento, Cal.—A. J. S.

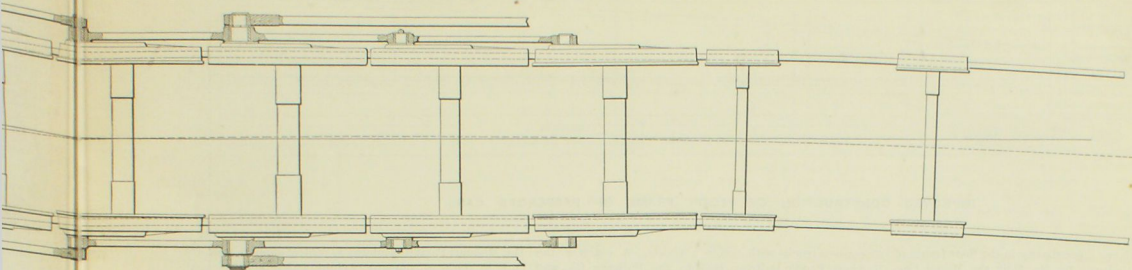


VALVE-GEAR, WITH PISTON AT END OF STROKE.  
Designed by A. J. Stevens, General Master Mechanic.

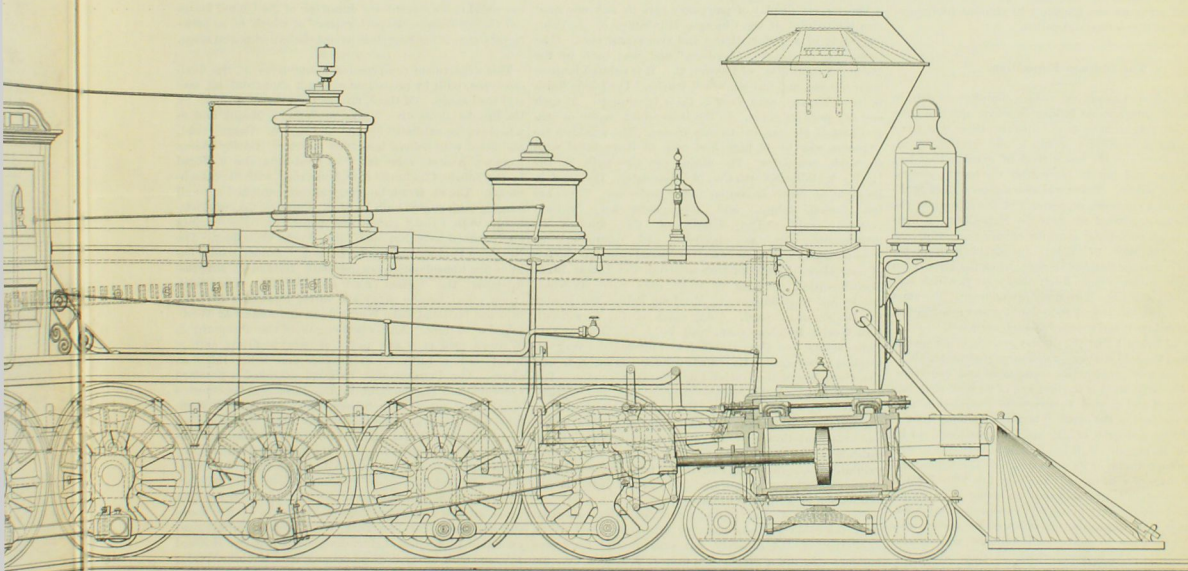


PLAN OF STEAM CHEST.  
Showing Valve Seats and Stems.





RAILS ON 12° CURVE. RAILS SPIKED TO GAUGE 4 ft. 8 1/2 in.



STEAM-WHEEL CONNECTED FREIGHT LOCOMOTIVE AND TENDER.

Build, at Sacramento, Cal.—A. J. Stevens, General Master, Mechanic.

Diameter of Cylinders.....	21 in.
Stroke of Cylinders.....	36 "
Diameter of Driving-Wheels.....	4 ft. 9 "
Driving-Wheel Base.....	19 " 7 "
Rigid Wheel Base.....	14 " 7 "
Total Length of Engine and Tender.....	65 " 5 "
Total Weight of Engine.....	73 tons.
Weight on Driving-Wheels.....	64 "
Weight of Tender (light).....	50,000 lbs.
Capacity of Tender.....	3,000 gal.

The peculiarities of the valve gear of this engine are shown in the engravings. A sword-arm rotating on the center of its length and located near the steam chest, is driven by a rock-arm connection from an eccentric, or a return crank from the main pin, thus allowing the fire-box to be extended if necessary to the extent of the room occupied by the eccentrics. A block, sweeping from end to end of the sword-arm, drives a vibrating-bar connected with the T-headed lever, which swings from this bar, as shown. To each end of the short arms of this lever a valve-stem is connected, which drives the slide-valves located at each end of the cylinder. These valves have the Allen principle of supplementary steam passage in the valve extended to the exhaust as well as the admission. The lower end of the T-

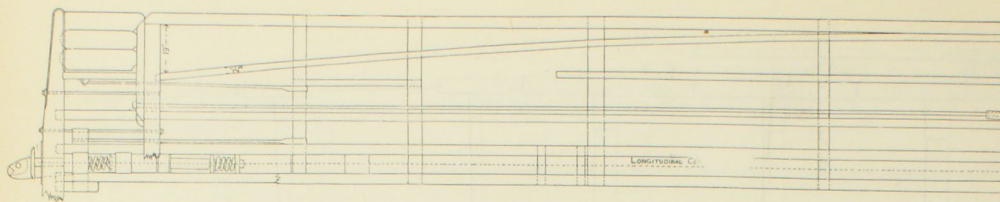
headed lever receives its motion from the crosshead. The action is somewhat similar to the Corliss wrist-plate, and gives an exceedingly rapid opening and closing of the valve. On a 17x30-inch cylinder fitted with this gear, the steam port is opened wide as soon as the crosshead travels two inches, the valve remaining nearly stationary until 28 inches of the stroke is completed, when it closes as suddenly as it opened. This peculiar action is due to the partial rotation of the lever around its pivoted point in combination with a positive movement from the sword-arm. When the engine is cut up to 9 inches, the admission provided by the valve is  $\frac{1}{2}$  of an inch as against  $\frac{3}{4}$  of an inch if the gear were an ordinary shifting link. The exhaust is not opened until 57 inches of the stroke is completed, when cutting off at practically one-fourth of the stroke. The compression commences as late as is desired, and rises to the chest pressure.

The advantages of this gear are, that it gives a distribution of the steam equivalent to that of the riding-valve, or theoretically perfect, and employs no eccentrics, if it be desired. The remainder of the joints are the ordinary pin-bushed kind, which will last about three years and involve but little expense. The

economy of the gear is equivalent to that of the riding-valve, and Mr. Stevens has demonstrated that this valve is greatly superior to the link-motion. The work performed by the only engine yet built with the new gear, shows that the work done by it is equal to that of two Mogul link engines of 17x34 inch cylinders, and that the fuel burned in doing its work is in the ratio of 125 pounds of coal as against 200 pounds by two link engines required to do the same work. The lead can be maintained either constant or variable, as may be desired. As to the superiority of this class of valve gear for heavy freight work, Mr. Stevens says there can be no doubt, and he is also of the opinion, that railway companies have lost millions of dollars by the use of the link-motion, which is comparatively as imperfect a device as are hand brakes when compared with air brakes for passenger trains.

But one engine has yet been built with this gear, but it is the intention to apply it to all engines on the road that require new cylinders, and as fast as possible. The illustrations are from the working drawings of a larger engine than the one built, but they show perfectly the application of the gear. The engine already built, and also the larger ones to be built, are intended for heavy hill-work.





IMPROVED CONSTRUCTION OF FLOOR FRAME OF PASSENGER CARS.

The engraving shows a peculiarity in the floor frame of passenger cars, introduced by Mr. Hoit, the Master Car-Builder at the West Albany shops of the New York Central road. It consists of putting in an arched or curved longitudinal timber between the intermediate and side sills, the position and form of which are shown in the drawing. This timber is of the proper length to admit of the two ends being sprung inwardly 19 inches from the side sill, and let into the end sill, as shown. At the center it is bolted to the side sill. This mode of construction, it is claimed, gives greater stiffness and rigidity to the entire frame, and prevents any tendency to sinuous motion, or "weaving" as it is sometimes called.

#### The Chicago Exposition.

The Exposition has proved to be a complete success, in spite of some unfavorable influences which attended the opening. As might have been expected, there was some confusion for several days, owing to the erection of additional annexes and the late arrival of exhibits that had to be arranged and put in place after the buildings were opened to the public. There was also a good deal of fault-finding by the local press, on account of the refusal on the part of the management to open the Exposition on Sundays. Only an occasional murmur of dissatisfaction was heard from exhibitors or visitors during the interval between the formal opening and the time when the Exposition may be said to have been fairly under way, which was about the 6th of June. The daily attendance at the start was about 2,500, but it was soon doubled and quadrupled, and on Saturdays it has reached as high as 25,000.

In view of the fact that the display as a whole is a special one, limited to such products, appliances and materials as pertain to railway construction, equipment and operation, and that the Exposition is the first one of its kind that has been projected and carried to successful completion anywhere on the face of the earth, it is not surprising that it should attract a degree of attention proportioned to its merits. In its amplitude, it has certainly very much surpassed the expectation of its most sanguine promoters; and as for the mass of visitors, only the very few who have a chronic disposition to grumble will go away dissatisfied. No power of description can convey, except in a fragmentary manner, the impression experienced by those who have taken the time to make an intelligent and careful survey of all the exhibits, comprising as they do an immense variety, but no unnecessary and wearisome repetition of the same things. To attempt any detailed description, even of the prominent features of the exhibition, would overtax our space, and we shall therefore confine ourselves to what will be most likely to interest those of our readers who may not have had an opportunity to visit Chicago and see for themselves.

#### RAILWAY AND STREET CARS.

The railway car equipment is represented by 51 cars, including passenger and freight cars, every one of which, like soldiers on dress parade, is shown to the best advantage for inspection and review by the chief railway officials and car-builders of the land, to say nothing of a great many curious and interested observers from other lands, and constituting the largest and grandest exhibit of the kind ever seen. By far the most attractive of the lot are, of course, the passenger cars, both for steam and street railways. Among the former is a coach—we use this term to distinguish the vehicle from a sleeping, drawing-room, or parlor car—exhibited by the Chicago & Atlantic Railway Co., and built by the Jackson & Sharp Co., Wilmington, Del. The outside color is light yellow, relieved with ornamental striping that is extremely effective. The platform steps are faced with embossed brass plates. The inside is finished in mahogany throughout, with ceiling of bird's-eye maple. The window panels are ornamented with hand carving of exquisite design and workmanship. The seats are upholstered in scarlet and old gold plush. At one end of the car is a compartment containing a marble top wash-stand, plate-glass mirror, closet and water cooler, and at the other end a compartment of the same size containing a Seales heater. The trimmings were furnished by the Union Brass Manufacturing Co., of Chicago; the lighting is by Foster's compressed gas ignited by electricity. The car is 54 feet in length and is mounted on four-wheel

suspension trucks with cast-iron wheels. A coach of the Northern Pacific Railway, built by the Pullman Co., and painted Pullman color, presented a fine outside appearance, but as it was kept locked, the interior was inaccessible. It had Allen paper wheels. The New York, New Haven & Hartford R. R. Co. exhibited one of its new coaches, designed by Mr. James Denver, the Master Car-Builder of the road. It is also painted Pullman color, and is a fine specimen of workmanship throughout. As these cars have already been fully described in these columns, it is unnecessary to go into details.

The largest display of passenger cars by any one road was the exhibit of the Chicago, Milwaukee & St. Paul, consisting of a parlor, dining and two postal cars. The parlor car is named "Aberdeen," and was built by the Barney & Smith Co., of Dayton, O. It is painted maroon color outside, and has six-wheel trucks. The inside finish is in mahogany, with Post & Co.'s trimmings. At each end is a smoking room. In the intervening space or central part of the car are twenty chairs. The windows are 50 inches wide by 46 high, and each of them fitted with Reynolds' ventilator. The dining car was built by the Harlan & Hollingsworth Co., of Wilmington, Del., and in its style of finish is similar to the parlor car. There are ten dining tables, and the chairs have leather-covered seats. The details of the kitchen arrangements are as perfect and complete as it is possible to make them. The postal cars are models of their class. The trimmings are from the Union Brass Manufacturing Co. All of these cars have six-wheel trucks, and were designed by Mr. John Baillie, the Master Car-Builder of the road. A day coach of the Cincinnati, Van Wert & Michigan road, built by J. G. Brill & Co., Philadelphia, was also exhibited, and presented a very attractive appearance. Its outside color is Tuscan red, and the wheels are of the Lobdell Car Wheel Co.'s make. The Pullman Car Co. exhibited two sleeping cars, the "Utica" and the "Lampasas," that are in every respect worthy of the builders. In design, workmanship and palatial finish and ornamentation they are masterpieces. The interior finish is in mahogany. The Chicago & Northwestern road exhibited a superb dining car. It was built at the Pullman shops, and although it was among the late arrivals, it has attracted a great deal of attention.

The display of street railway cars, including cars used with the cable system, was very attractive; and as an exhibition of the capacity and skill of the respective builders—the John Stephenson Co., J. G. Brill & Co., the Chicago Cable Car Co., and the Chicago City Street Railway Co.—leave nothing further or better to be desired. The Chicago cable car was placed on an elevation, with attachments to show the working of the cable system in a way that could easily be understood by visitors. There were four excavator cars, built respectively by the Industrial Works, Bay City, Mich., Wilcox & Stock, Toledo, O., American Ditching Co., Minneapolis, Minn., and the Bucyrus Foundry Co., Toledo, O.; also four refrigerator cars, the property of private parties, and three snow-plows, built by the Muskegon Car Co. of Michigan and the Hawley Snow-Plow Co. of Canada. Refrigerator cars were also exhibited by the Chicago & Alton, Grand Trunk, Chesapeake & Ohio, and Chicago, Burlington & Quincy roads, and also by the Merchants' Dispatch, each car having some special features of utility or advantage. The New York, West Shore & Buffalo road exhibited a freight box car, built by the Pullman Co., and painted red, weight 24,900 pounds, and carrying capacity 50,000 pounds. The Chicago & Alton exhibited a box car built by the Michigan Car Co., weighing 28,100 pounds, and with 40,000 pounds carrying capacity. A scraper and leveling car of the Terre Haute & Indianapolis road, and a caboose car of the Lake Shore road, both built in the company's shops, attracted considerable attention. A track-laying car was exhibited; also a box car of the Northern Pacific road, weight 24,200, capacity 40,000 pounds. A dump car, built by the Youngstown (O.) Car Works, and capable of dumping its load on one or both sides or between the track, elicited much favorable comment; also a box and caboose car, built by the Lafayette (Ind.) Car Works, and left unpainted for the purpose of showing the material and workmanship to better advantage. The Ohio & Mississippi road exhibited a grain car built in the road shops, weight 22,334 pounds, capacity 40,000 pounds.

The Missouri Pacific exhibited a central-support box car, built by the road company, weight 32,300 pounds, capacity 70,000 pounds. This central support is a third truck placed under the car body midway between the two end trucks, and bearing its proportion of the load. This plan has been in operation for some time as an experiment on several Western roads, but with what result has not been definitely stated. A box car is exhibited by the St. Charles (Mo.) Car Co.; also one by the Allen Paper Car Wheel Co., built by the Pullman Co., and one by the Wells & French Co., of Chicago; and lastly, but not by any means the least, the well known screw-lever dump car of the United States Car Co., of Boston, the performance of which is so satisfactory that it has long since passed the experimental stage.

#### LOCOMOTIVES.

This department comprised 26 locomotives of the modern types, built by prominent contract shops and by several road shops. Of these, no less than seven are built by the Brooks Locomotive Works, including a Mogul and 8-wheel engine exhibited by the Chicago & Atlantic road, and fitted with Sellers' improved injectors, Crosby steam gauge, pop safety-valve and Post head-light; also a Mogul by the Toledo, Cincinnati & St. Louis road, with like attachments. The St. Helen Logging railroad exhibited a small logging tank engine built by H. K. Porter & Co., of Pittsburgh, with Crosby gauge and pop-valve. The engines above named have National Tube Works Co.'s flues. The Northern Pacific, and Lac La Belle & Calumet roads, exhibit fine Consolidation engines with Nathan & Dreyfus' injectors; the former road an 8-wheel engine with Allen wheel, Crosby gauge and valve, Nathan & Dreyfus injector, National Tube Works flues, and Adams & West-lakes' head-light. An 8-wheel engine of the Pittsburg & Western road is a fine piece of workmanship, and is fitted with a Little Giant injector and boiler tubes as above. The Pennsylvania Railroad exhibited a standard Consolidation engine, built by the Pittsburg Locomotive Works, and fitted with Sellers' injector, Adams & West-lake head-light, and flues as above. The St. Louis Coal Co. exhibited a Mogul engine, built by the Dickson Manufacturing Co., of Scranton, Pa.; the Southern Pacific R. R., a Stevens riding-valve engine, built by the Cook Locomotive & Machine Co., of Paterson, N. J. The rapidity with which the new engines of Mr. Stevens are growing in favor attracted large numbers of visitors to see this monster machine. The New York, West Shore & Buffalo road exhibited an 8-wheel engine, designed by the late Howard Fry, and built by the Rogers Locomotive & Machine Works. A 6-wheel connected engine, built at these works, was also exhibited by the Richhill Coal Mining Co.; the New York & New England road, a Mogul built by the Rhode Island Locomotive Works; also a fine engine, by the same builders, was exhibited by the Chicago, Milwaukee & St. Paul road; and another by the Dayton & Hamilton road, built by the Dickson Mfg. Co. One of the late arrivals was a substantial 8-wheel engine built at the shops of the Baltimore & Ohio road, and exhibited by that company. It has Allen wheels, Crosby valve, chime whistle, etc. The Shaw locomotive, built by the Hinkley Locomotive Co., was an object of considerable interest on account of its peculiar construction and the high expectations that are entertained of its capacity. It was jacked up and kept running most of the time, the water being supplied by a Hancock inspirator, which is highly spoken of by Mr. Lockwood, who has the engine in charge. The Wootton coal slack burning engine, No. 372, attracts much attention from railroad men on account of its successful use of this kind of fuel. As there are large accumulations of this fuel in various parts of the country, this type of engine seems destined to be very extensively used. The Reading Co. has 150 of them in service. The Mt. Savage (Md.) Locomotive Works exhibited a handsome narrow-gauge engine.

#### OLD CURIOSITIES.

As might be supposed, this department attracts its full share of attention. The more the capacities of railways are developed in the way of powerful locomotives, palatial cars and mechanical appliances of every description, the greater will be the desire to preserve for future inspection the antique relics of their crude beginnings. The value of these relics will increase with the lapse of time, and they will ultimately be gathered into museums for the edification of the curious. The present collection, in a kind of



out-of-the-way corner of the annex, is probably as large and as varied as ever will be got together again, in this country at least; and consequently it well deserves the attention it receives, not only from railway men and professional mechanics, but from the great mass of miscellaneous visitors. The display includes a great many interesting contributions from abroad, among which is the "Samson" locomotive, exhibited by the Intercolonial Railway of Canada. It was built in 1838 by Timothy Hackworth, at Sheldon, England, but was subsequently brought to Nova Scotia, where it has been running until August of last year in charge of George Davidson, who helped build it. He is 84 years of age, and was also to be seen in the annex with the engine. On the side-rods of this engine can be seen what was doubtless the original split-key. Instead of being held by a set-screw, the key is prevented from backing out by a wedge driven into a split, which extends nearly to the top of the key. Near by is another of the early engines, the "Arabian," built for the Baltimore & Ohio Railroad by Phineas Davis, and still in active service in the Mount Clare shop-yards, at Baltimore. It is 49 years old, having been completed in 1834. The "Pioneer," another ancient engine, was built in 1836 by M. W. Baldwin, of Philadelphia, for the Utica & Schenectady Railroad. It now belongs to the Chicago & Northwestern road, and has been greatly modified from what it was originally, iron frames and drivers having been substituted for wooden ones. Next comes the famous "John Bull," built by the Stephenson, in England, in 1831, for the old Camden & Amboy road in New Jersey. It has a spiral spring to transfer the weight of the forward part of the engine to the truck. This spring was applied to it by Isaac Dripps about 40 years ago, and is claimed to be the original spiral spring used for this purpose. Stephenson's original locomotive, built in 1825, is the most interesting and attractive of the antiques, and was always surrounded by a crowd.

The Harlan & Hollingsworth Co. exhibited an old passenger car built by the original firm in 1840, for the Tioga Railroad, and still in a good state of preservation. An old style passenger coach was also shown along with the "Samson" engine. It was built in Nova Scotia about 25 years ago, and as a piece of antiquity is nothing very remarkable. Some official notabilities are said to have ridden in it, including members of the reigning family. No more perfect specimens of model-making were to be found in the entire exhibition than the models of English locomotives and railway coaches exhibited by the North London Railway Co. and J. Taylor and T. Hudson, of Darlington, Eng. The coach models show the framing and other points of construction in a way that will be likely to interest car-builders. The body of the vehicle is carried on four wheels, the boxes are carried in jaws, while the springs, which extend fully one-third the total length of the car, are placed with the concave side up, the center resting on the boxes and the ends bearing against the under side of the sills. A running or foot-bar extends the entire length on each side. The car is divided into four compartments, the partitions doing away with the necessity of carlines. There is no clear-story or raised roof. The seats run crosswise, and will hold three persons separated by arm rests. There is a door on each side for each compartment; the lower part of the door is upholstered on the inside. There are no end windows, and on the outside there are step-ladders similar to those used on American freight cars. The coupling is made by a hook which occupies the place of a draw-bar, and the link looks like the tightening-up brace of a buck saw. By means of the link the slack is taken up after coupling by turning the central bar, which is threaded. Two buffers, similar to those used with the Janney coupling, are placed near the outside at the ends. The side framing consists of window posts with studs beneath the belt-rail. There are no diagonal braces. The floor frame consists of side and end sills, with three cross timbers framed in, between which are laid radiating and center sills. There is also a model of a coal car in which the side sills extend beyond the end sills. Blocks for receiving the buffers are fitted into the outside angle of the extension.

The London & Northwestern Railway Co. sent a very interesting lot of photographs, which our space will not allow us to particularize. Mr. David Matthews exhibited some very old drawings of the "Best Friend," "DeWitt Clinton," and other old time engines built by him while he was employed by the West Point Foundry. These drawings of his show that the petticoat-pipe, pit 4, deflecting water leg in fire box, cone in stack, equalizer, horizontal cylinder and other devices now in use originated with him. He is now superintendent of the San Francisco (Cal.) Gas Works. The boiler of the "Stourbridge Lion" was also exhibited, and is still in a serviceable condition, although the engine of which it formed a part commenced running as long ago as 1829. Old rails, rail-chairs, ties, fastenings and various obsolete things illustrative of early railroading were exhibited by the Vickelberg & Meridan, Boston & Lowell, Jeffersonville, Madison & Indianapolis and other roads. It is impossible to do justice to the "Old Curiosity Shop" in a brief summary. There is in it descriptive material enough to fill a portly volume. Pity the precious material is to be scattered in all directions instead of forming a permanent collection and a nucleus for future accretions.

The miscellaneous display in the main building not only

had the merit of variety, but the exhibits with scarcely an exception were displayed to the very best advantage. The monotonous repetition of the same things seems to have been avoided, and the interest and curiosity of visitors kept constantly on the alert. About 150 car-coupling devices were exhibited, which was certainly within the limits of moderation, considering the amazing resources of inventive ingenuity in the working out of this intricate problem. Many of them are meritorious and well worthy of attention, while others are too complicated and costly to be regarded with much favor by railway men. There was a goodly number of brake devices, of which it may be said that the inventors seem to have a correct comprehension of what is required, and to have done vastly more to improve this feature of railway service than could have been expected a few years ago. The variety of articles embraced in the category of car trimmings and fittings were displayed to great advantage, the arrangement in many instances being in a high degree artistic, showy and attractive. Car stoves and heating apparatus were well exhibited, and in a way to enable visitors to see the comparative merits of the respective methods and devices. Car wheels of every style, size, material and pattern were shown; also the different kinds of continuous draw-bars. The manufacturers of car and locomotive springs were well represented; the variety and beauty of their products, and the tests which were made of the essential qualities of strength, lightness and elasticity, attracted much attention. There were rough and finished axles, journal boxes and bearings, head-lights, lanterns, and no end of frogs and switches. The diversity in the forms and patterns of journal-brasses was equal to that of the stock of this material which is usually found in the supply rooms of first-class repair shops. The display of paints and varnishes was an evidence of their importance in car decoration and finishing, and an evidence also, if any additional proofs were needed, of the superior ability of this class of exhibitors in making their wares presentable and attractive by a highly artistic arrangement. The signal and switch controlling apparatus was shown in its practical working, and the clang of gongs and bells in connection therewith added excitement to the scene.

The display of wood-working machinery was very complete. One manufacturing concern had enough in operation to build an entire box car. Hard woods and veneers were exhibited in great variety in the log and otherwise, and including every rare and beautiful specimen of cabinet woods known to the trade. Specimens of timber that had been subjected to preservative processes; car seats, upholstery and mattresses; shop tools of every description known in railway machine shops, and some as yet but very little known; pumps and injectors; nut-loosers in such variety that the spectator wonders how so many tapers, so to speak, can be played on this one string; clocks and watches; cut glass and chinaware; a noisy well-sinking apparatus; windmills and water tanks; weighing scales; rock crushers; wire ropes and sections of the East River Bridge cables. There were several splendid specimens of modern stationary engines, all at work driving some portion of the machinery. There was also a large display of locomotive attachments; boiler iron in sheets; gauges, taps and bolt-threading machinery. Several freight and passenger car trucks of elaborate finish and beautiful workmanship were to be seen both in the main building and annexes. Among the machine tools was a new car-wheel borer which deserves the attention of master car-builders. The boring-bar is fitted with four cutters. A hand-crane attached to it, together with a clutch for instantly throwing the bed into or out of gear, and an instantaneous operated feed motion, are its leading features. In connection with this machine was exhibited a twist or flat drill grinder, and a 30-inch lathe. The former is an exceedingly simple and valuable tool, and the latter surpasses anything extant in the lathe line. Another invaluable machine was a car wheel grinder which provided for using four emery wheels at once for grinding cast iron wheels, or it can be used with a less number for turning off steel tires or doing other work. The electric railway of the exposition was a complete success.

### Communications.

#### The Chicago Exposition—Impressions of a Practical Railway Mechanic.

To the Editor of the National Car-Builder:

Having visited the great Exposition of Railway Appliances, at Chicago, and feeling duly impressed with the varied and wonderful display of practical and impractical devices there exhibited, I beg leave to send you a few generalities which may be of interest to some of your readers who were not there to see for themselves.

The visitor, whether a mechanic or a dry-goods clerk, can not but be interested in such an unprecedented array of machinery, tools and the innumerable things included in the general designation of railway supplies. Never before has such a collection been displayed for the inspection of the outside world. Everything, from the superb sleeping-car to the insignificant and unpretentious rail-spike, is artistically exhibited on stands, in show cases, or in gorgeously arranged pavilions. The smooth-finished steel plate and the accurately flanged boiler-head, stand in close proximity with the delicate and microscopic machinery of the tool-maker. That modern Vulcan, the ponder-

ous steam-hammer, strikes with a precision as exact as the intricate watch movement displayed near by. At every step a wide field is opened for the progressive and thinking mind. The hard-fisted toilers whose vocation it is to harness the earthquake power of steam, may well feel proud of their calling as they survey in these exhibits the grand results that have been realized in so short a time by energy, perseverance and pluck.

The display of locomotives, considering the number and capacity of the establishments engaged in their construction, is not quite up to what was generally expected. The Rogers Locomotive Works step to the front with a type of passenger engine, which, to the progressive mechanic, is in advance of all others. The form of the parallel and main rods, mode of fitting rod-brasses, the ingenious and serviceable attachment on the boiler-head for injectors, blower-cock, etc., cannot fail to attract the attention of railway men. I had the satisfaction of seeing for the first time that wonderful machine vulgarly called a "dirt-burner," or "locomotive ostrich," sent to the exhibition by the Philadelphia & Reading R. R. Co. A casual examination of it leads to the conclusion that, as a consumer, its stomach is not one of the dainty sort. Some of the "boys" who were looking at her insinuated (whether maliciously or not, I cannot say) that the dirt she burned was as large as a "piece of chalk." But in this they were probably mistaken. The "Shaw" locomotive received its full share of attention from all classes of visitors, many of whom were no doubt bewildered by the technical phraseology employed by those who made it their business to explain the *modus operandi* of the machine, such as "reciprocating mass," "center of gyration," "velocity at the periphery," "lateral steadiness," etc., especially as these recondite terms were mixed with the Babel of explanations that constantly assailed the ear. The matter of balancing driving-wheels at high speeds, either by dead weights or by the counter-action of the pistons, received a thorough ventilation, no doubt; but whether the results will be in favor of the Shaw principle is yet to be determined. In respect to stationary engines, the high speed problem has been satisfactorily solved, and there is only a difference of opinion as to its application to locomotives. The majority of mankind (lunatics not included) are content to make life's journey at sixty miles an hour, and the rate of speed can doubtless be attained by the use of a larger wheel with the present style of locomotive, and with comparative safety. To go beyond this limit, except when an engine runs "on parade," would necessitate radical changes in construction of rails, wheels, road-bed, etc. It is a question whether the gain in steadiness claimed for the Shaw engine will compensate for the additional cost of construction and repairs.

There is another feature of the exhibition which is amusing as well as instructive to all who take the trouble to give it a careful inspection. I refer to the display of car-coupling devices, of which there are about 120 in all. Such a miscellaneous assortment of this class of appliances was never before seen, and when it is remembered that this collection is only a small portion of these inventions that have actually been patented, the wonder is that inventive ingenuity has not been exhausted long before this in attempts to work out the problem. It is safe to say that not more than a dozen of the entire lot have any practical value in meeting the requirements of railway service. Many of them are so queer, cranky, complicated and absurd, that any one who is familiar with the handling and making up of freight trains is forced to the conviction that their inventors knew as little about what is needed in appliances of this sort as a kitten does about snipe-shooting. The enthusiasm and self confidence of some of the exhibitors are irresistible. While glancing at one of these rattle trap pieces of mechanism, that seemed to be more puzzling as to its design and purpose than the rest, I was so reckless as to ask it if it was an improved mouse-trap, when the proprietor remarked that I was no railroad man, or I would never ask such a question. The thing I was looking at, he said, was an "improved automatic safety car-coupler," and it was only a question of time, and a very short time, too, as to its general adoption on all roads. Thus much in regard to the ludicrous aspects of these devices. I desire to cast no reflection on the praiseworthy efforts of intelligent and level-headed inventors who are trying to do something to lessen the appalling record of accidents in car-coupling.

There are other features of the exhibition that invite comment, but their name is legion, and any attempt in the way of description would fill a volume.

SPRINGFIELD, Ill., June, 1883.

#### The Exposition of Railway Appliances.

To the Editor of the National Car-Builder:

Among the hosts of this world's unfortunates should be included those railway men who from any cause have been prevented from the seeing the exposition, thus missing the chance of a lifetime. In order to convey some idea of what was to be seen to those of your readers who may have been among the absentees, I send you the following summary. To mention every article in detail would fill a volume, and as the display included much that unde-



serving of notice, I shall speak mainly of such exhibits as have obvious merit:

The display of machine tools was magnificent, although there were but very few novelties in that line, and but few tools were exhibited that could not be found in any well-regulated and equipped shops. The reason for this is that when an improvement is brought out a little judicious advertising brings it to the notice of those who are in need of such tools, and they secure them at once. Such tools as master mechanics and car-builders take an interest in were exhibited in the greatest profusion, and, as a rule, they were marvels in design and workmanship. One of the first things that attracted the attention of practical men was a huge blower, which constantly sent a powerful current of air upward and contributed greatly to the ventilation of the building. Near this was an automatic sharpener for circular saws, which did excellent work. Steam-hammers were exhibited in great numbers, and they were certainly a credit to the exhibitors. Radial drills, car-wheel borers, and lathes and planers for all purposes, shapers and slaters and special tools of every description were in abundance. The wood-working machinery attracted much attention, although there was nothing containing very novel features.

One of the finest exhibits is the samples of woods. Redwood from California, cedar from Alaska, pine from Georgia, oak, ash, basswood, walnut, maple—in short, this exhibit comprised specimens of all native and foreign woods known to car-builders. Varnishes were an attractive feature, and the display of car trimmings was excellent. In the line of car finishing and equipment, inventors seem to have tackled everything but ventilation. The ventilator men are scarce, but the coupler men are in force. Not far behind the coupler cranks are nut-lock men, who are becoming very numerous, and are as demonstrative, withal, as those who "have the best coupler on earth." Minerals from the lines of roads in the mining districts, tropical plants from the South, and specimens of the finny tribe from more northern roads. Steam pumps were an interesting feature, and every appliance connected with water supply was on exhibition. The machinery department on the main floor was one vast machine shop and there was much to admire and nothing to condemn. The electric railway in the gallery did a thriving business, and while it was a pleasure to take a trip around the circle, walk among the exhibits in the gallery was anything but pleasant. Here were thousands of nut-locks, couplers, brakes, safety-switches, signals, and an endless variety of worthless contrivances. The only good thing was the opportunity afforded visitors to see how much chaff there is in inventions, and it is safe to say that while one meritorious invention was found there were fifty that were wholly impracticable.

But without all these the exposition would not have been complete, and would not have served its purpose. The inventors of these impracticable devices are mostly poor men who can ill-afford the expense of exhibiting their wares, and hundred have used their last dollar in the search of fame and fortune, which they confidently expected to find awaiting them at the doors of the exposition. But while many of these men have suffered, they have labored in a good cause, and let us hope they will meet their reward in the sweet by-and-by. The best appreciation of a good thing comes from a comparison with the worst; therefore, the exhibitors of clap-traps have been of incalculable benefit to those who had good things to show. Contrast has its advantages, and it is exemplified in the effect of ranging side by side meritorious and worthless devices. The Old Curiosity Shop attracted much attention, and as that was in the same annex with the new locomotives, the visitor could look on the old "Puffing Billy," "John Bull," etc., which look like mere scrap heaps, and by turning his head, gaze with wonder and admiration on a monster of 93 tons. Here were the two extremes. The oldest track material and the newest; the oldest locomotive of a weight of 44 tons, which is a rusty, worn-out affair and its neighbor is a monster of 93 tons and polished and shining in all the glory and splendor of modern mechanics. Some of these ancient boilers were made in 1813, and look as though they might do service yet, although, like men past their eighties, they have had their day and should go to rest.

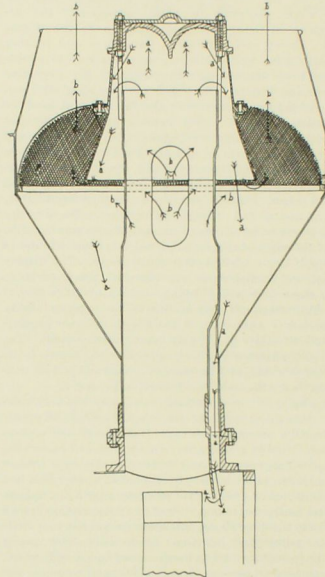
The display of every description of passenger cars was magnificent, although, as before stated, there was nothing novel in them, except to roads that are behind the times, and whose officers do not read the advertisements in the railway publications that come to their address. The Fontaine locomotive was conspicuous by its absence. The Shaw locomotive was on hand in working order, and it was interesting to hear the Master Mechanics argue for and against Mr. Shaw's alleged improvement. Railway officials were very much interested in the excellent display of office furniture, and some of the desks were marvels of convenience and elegance of design. Engineering and surveying instruments were a prominent feature, and perhaps the best idea that can be gained of the magnitude of the great show is for every one to keep in mind the fact that nearly every thing from a spike to a locomotive, and from a tiny working model of a locomotive of 90 lbs. to the "Mastodon" of 93 tons was there.

Among the things that may be said to be lacking was the snow-plow, although there were several on exhibition. Another thing was not shown that the world is much in

need of, and that is a reliable foot-guard for frogs and guard rails; also a hand-car for section men, road-masters, civil engineers and telegraph repairers. The hand-car that turns with a crank and is the standard car for the Middle and New England States, was not there. Stock cars were numerous, and some of them were excellent. One of these cars is so arranged that hogs, sheep, cattle, horses and poultry can be shipped in small lots in the same car, and all can be fed and watered and cared for in every particular. The partitions and decks can be folded to the sides, ends and top of the car, so that it can be utilized for general freight. Altogether the show was a success.

WM. S. HUNTINGTON.

CHICAGO, JUNE 1883.



Improved Spark-Arresting Stack.

The cut represents an improved spark arresting stack which is being used with great success on the engines of the Union Pacific Railroad. The method shown is the invention of Mr. I. H. Congdon, the General Master Mechanic of the road, and its operation is as follows: The sparks and cinders in passing up the stack strike the cone with a sufficient force to be broken up. They then follow the course of the arrows *a a a*, the heavier ones being deflected downward through the spark pipe to the front end, when they are met by the exhaust and carried up again. When the cinders are broken fine enough to be influenced by the current of smoke and steam entirely, they are carried out at the side openings of the stack in the direction of the arrows *b b b*. The lighter portions, when the volume of smoke and steam is arrested and repulsed by the cone, at once find an outlet in the side openings, but the sparks and heavier cinders are carried by their momentum against the cone with great force, and are so completely pulverized as to prevent any cutting of the netting, which will last as long as the body of the stack.

#### Boston & Albany Railroad Track.

Mr. P. H. Dudley went over this road last fall with his dynamograph car, and writes to President Bliss in reference to the result, as follows:

"I have just completed the comparisons of diagrams of track inspection of various roads, covering nearly all possible conditions of service found in practice. Briefly stated, your own line makes so favorable a comparison that but few suggestions can be offered as to improvements with present materials and reasonable expenditures. Your road is very justly acquiring a reputation for being as easy a riding track as any in the country; while some railroad men give it the preference. Your curve approaches and elevations are very fine, and, with the exception of a few sections on the second division, when we passed over the line the joints were so firm that we spotted more rail centers than joints. Keeping the joints so firm that the wave of the rail caused by the passing train is transmitted to the next rail, and not broken at the joint, is one of the great requisites of an easy riding track. The wear of the rails can not be prevented, especially on the curves and grades, but by proper care of the joints, often renewing the fastenings, the easy riding of the track may be well maintained. For a road of your characteristics the quality of steel is one of the most important matters. A good track cannot long be maintained when the quality of steel is inferior, either as a chemical or mechanical product. The evidence is quite conclusive that the fast passenger trains do less damage to the track than the slower running freight trains, with their inferior springs. Your own views are fully corroborated that after you get your tracks up to a certain condition you 'cannot do much better.'"



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#### EDITORIAL ANNOUNCEMENTS.

Addresses.—Business letters should be addressed, and drafts and money orders made payable to THE NATIONAL CAR-BUILDER. Communications for the attention of the Editor should be addressed EDITOR NATIONAL CAR-BUILDER.

Advertisements.—Nothing will be inserted in this journal for pay, EXCEPT in the ADVERTISING COLUMNS. The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.

Contributions.—Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.

Special Notice.—As the CAR-BUILDER is printed and ready for mailing on the last day of the month, advertisements, correspondence, etc., intended for insertion, must be received no later than the 25th day of the month.

SUBSCRIPTIONS to the CAR-BUILDER will be received, and orders kept for sale, at the following places:  
A. WILLIAMS & Co., 283 Washington St., Boston, Mass.  
L. SCHAFFNER, Cigar and News Dealer, Grand Pacific Hotel, Chicago, Ill.  
WILLIE H. GRAY, 306 Olive Street, St. Louis, Mo.  
ROBERT CLARKE & Co., 65 West Fourth Street, Cincinnati, Ohio.

#### THE MASTER CAR-BUILDERS' CONVENTION.

The attendance at the Chicago meeting indicates that the Car-Builders' Association is a growing institution so far as numbers are concerned. This being the first annual meeting after the reorganization, there was naturally an increased interest in the proceedings, and this of itself would attract many to the convention to say nothing of the universal desire to see the great Railway Exposition, which had just got under full headway. Under all the circumstances, no very marked results were looked for at this meeting as compared with what has been done at previous meetings. Under its present auspices the association is a new machine, so to speak, and like all new machines, requires a little time to get itself into good working order.

The reports of committees are the best criterion of the nature of the work the association has in hand, and a careful examination of these reports will indicate in a general way about what is likely to be accomplished within the next year or two in dealing with the leading problems which now claim its attention. Reports were made this year by all the committees except three, and taken together there is little in them to justify unfavorable comment. There were no reports on Links and Pins and Brake Attachments, owing to the death of the late Howard Fry, who was chairman of the respective committees on these subjects. Mr. Adams stated that there was nothing new to report on Steel-Tired Wheels. Three of the ten reports that were made relate to subjects that have not hitherto been in the hands of committees, viz.: Refrigerator Cars, the Grinding of Iron Car Wheels and the Decoration and Furnishing of Passenger Cars. The other subjects reported upon have been discussed so much at previous meetings that there is really little that is new or original to be said in regard to them.

The report on Standard Trucks is brief and to the point, but not very encouraging. It says that a revolution is impending in the construction of trucks, that a standard freight truck must necessarily be different from any of the existing styles, and that the time has not yet come for deciding just what the standard shall be. The committee, however, suggest certain points in its construction that are deemed essential, and hope these points



will be so fully discussed that a design worth considering can be presented at the next year's meeting.

On the subject of the most Economical Carrying Capacity for Freight Cars, a summary of the replies to circulars is given, which leaves the matter in as much obscurity as ever. The committee say, however, that the present dimensions of the master-car-builders standard axle are sufficient for a load of 3,000 pounds per wheel, and that the centre of the axle should be 4 inches in diameter to run with 33-inch wheels.

No new light is thrown on that much belabored subject, the causes of Accidents to Trainsmen, nor is any new light needed. The causes are so plain that no one with his eyes open can possibly be in any doubt as to what they are. As to the means of prevention, they are also equally obvious, and have been clearly set forth in the reports and discussions of the association time and again. The trouble is that no attention is paid to the means of protection that have been recommended, and so long as this state of things continues, committee reports on the subject will be like water spilled upon the sand.

The report on the utility of Grinding Cast Iron Car Wheels is decidedly favorable to the process, so far as the testimony goes which the committee embody in their report. According to this testimony, all iron wheels, both new and old, are more or less out of round; the grinding makes them round, and round wheels under cars are better and more economical than wheels that are not round. The committee are unable, however, owing to a lack of reliable data, to determine just what amount of economy is attainable.

With respect to metallic cars, the committee say that iron and steel must come more largely into use as material for cars, but that as the world was not made in a day, a perfected steel or iron car cannot be completed at once.

The report on Wheel Gauge recommends  $\frac{1}{2}$  in. clearance for 4-8 track; distance-gauge between flanges 4 ft.  $\frac{1}{2}$  in.; that the gauge be from inside of flanges; and that the curve of rail-head and flange of wheel be  $\frac{1}{4}$  in. radius. With respect to form of section of treads and flanges, the committee reach no conclusion.

It is evident that the annual committee reports can not be essentially different from what they have hitherto been until some means are employed for procuring information which is not now attainable. The committees themselves, constituted as they now are and have been in the past, can not make the research and investigation that are requisite in order that the association may reach a high degree of efficiency. Some other agency is needed, and such an agency has yet to be organized, either as a working power of the association itself, or as a co-ordinate body capable of dealing with questions which can not be definitely determined by comparing opinions and counting noses. This suggestion is not made with the idea that it is a very practicable one. We know it is not; but its importance will become more and more apparent as the car-builders get to dealing with the fine points in their efforts to design and establish standards of construction. The association as now organized is well adapted to the work of bringing about an agreement in opinion upon controverted points; but such agreement, even if attainable, does not insure uniformity in practice. This uniformity does not depend so much on numbers or increase of membership as it does on the disposition of the roads to do what is recommended.

One gratifying result of the reorganization is the increased revenue of the association. It is estimated by the Secretary that the income for the ensuing year will be ample for present needs, with a small excess for experimental work. We venture to say that the excess, be it large or small, could not be expended to better advantage than for the purpose named. The railway companies could not do a better thing to-day than to raise a fund of half a million, to begin with, to be expended in experimental research, provided the difficulties in the way of organizing such a department and securing for it an honest administration could be overcome.

#### FREIGHT TRAIN SPEED.

In experiments made with a heavy freight train on a western road several years ago by Mr. P. H. Dudley with his dynamograph car, it was found that a speed of 18 miles an hour required less power and was more economical of fuel than a slower rate of speed, say 10 or 12 miles an hour. This was the result for the entire trip, including all the elements of resistance, frictional, atmospheric, grades, curves, etc. The track was in good condition and was laid with steel rails. The reduction in the amount of fuel consumed was very marked, owing to the fact that the engine developed its power at the higher speed much more economically than at a slower rate. It was also evident that journal and flange friction, within the limits of freight train speed, decreased with the speed, and that with proper curve elevation the resistance of such trains decreases in most cases as the speed increases. It was found, however, that when trains were run at a rate much above 18 miles an hour, the atmospheric or wind resistance increased faster than the other elements of resistance decreased. These results, it is to be presumed, were realized upon tracks with moderate grades and curves. Upon long and heavy grades, in connection with sharp

and frequent curves, the conditions would, of course, be very greatly changed.

Without going into an analysis of the various mechanical causes which combine to impede the movement of trains—an exceedingly difficult thing to do with any degree of precision—the fact seems to have been established by Mr. Dudley, that an average speed of 18 miles an hour for heavy freight trains, upon roads as straight and level as the New York Central and its immediate Western connections, is more economical as respects consumption of fuel and tax upon motive power, than a slower speed. But whether this limit can be exceeded with like results is not so clear. There seems to be a point at which the atmospheric resistance is increased to such an extent as to neutralize the decrease of frictional resistance due to increased speed. If this point could be definitely ascertained as respects freight trains, it would go far toward settling the question as to whether these trains can be run to advantage at a speed of 25 or even 30 miles an hour. The old theory that train resistance increases as the square of the speed, has been a good deal shattered by recent experiments with the dynamograph. In regard to passenger trains, Mr. Dudley found, if our memory is not at fault, that the draft of a certain train at starting was 12,000 pounds, while at a speed of 50 miles an hour it was only 3,000 pounds. And yet, if reliance is to be placed on some other authorities, the atmospheric resistance to passenger trains moving at high speeds increases in a ratio much greater than the square of the velocity, however it may be with journal and flange friction, curves and grades. That the maximum speed of passenger trains has not increased within the past thirty years, notwithstanding the efforts that have been made in the way of fast running, is an evidence that with them the practical limit has been reached, under existing conditions at all events.

It is highly desirable, however, that freight trains should move faster, so that a larger annual tonnage can be transported in a given number of cars. That they ought to move faster, with improved locomotives, steel rails, and better ballasted tracks, seems obvious. That their speed will be increased in the future about in proportion as grades are reduced and curves straightened on all our roads, there can be no doubt; whether the average rate of speed will be 18 or a much greater number of miles per hour, cannot at present be determined.

#### PRIZE MEDALS AND THE RAILWAY EXPOSITIONS.

That the Chicago Exposition has more than satisfied public expectation in every thing that was calculated to make it attractive as a spectacle, is evident from the descriptive details we print in this issue of the CAR-BUILDER, as well as from the favorable comment of the press throughout the country. In this respect it has been a magnificent success—to use a somewhat hackneyed phrase—and the credit belongs to whom it is due. The sequel also shows that it has been a great success in another respect. It has shown the absurdity of the system of awarding prizes and medals that has become such a marked feature of late in the management of industrial fairs and exhibitions. To undertake to apply this system in the exhibition of railway appliances that has just closed was a first-class mistake at the start, and was so regarded at the time by the general run of experienced and practical business men. If we may judge from the display headings and articles in the Chicago papers for the last few days, a large majority of the exhibitors have been wailing and gnashing their teeth and holding little indignation meetings to give expression to their sense of misplaced confidence in commissioners, jurors, and individuals who have had anything to do with the management of the exposition. The air is blue with charges of swindling and over-reaching, of unfulfilled promises and outrageous charges and exactions. Not only have there been errors and blunders, but the great show is said to have been run by a "ring," with all sorts of subordinate little rings, for the purpose of plucking the exhibitors as if they were so many geese ready and willing to part with their last feather. How much of this is true we do not know. There is always some flame where there is a good deal of smoke. With a lot of premiums to award and medals to distribute among a host of competitors in patented devices and railway supply manufacture, it were folly to expect that the exposition would wind up with a love-feast and the formation of a mutual admiration society, nor was it to be expected that the exhibitors *en masse* would tender the commissioners and jurors a grand public dinner garnished with costly wines, complimentary toasts and adulatory speeches.

What the exhibitors wanted, and what they were clearly entitled to in view of the inducements held out to them in the official circulars sent out by the managers, was an examination and test of their respective exhibits, and an award based on such tests; and this should have been done before the close of the exhibition. But it seems there were no examinations, no tests, no awards and no medals, so far as we can ascertain at this present writing, nor was the competition fee of \$5 returned to the confiding ones who had paid it. Surely there has been culpable mismanagement somewhere, or else it was clearly a case that did not admit of being managed at all. We are inclined to favor the latter alternative. To decide

upon the merits of several thousand inventions without partiality or unjust discrimination is something which no jury or juries of scientific experts even can do off-hand; and if they could do it, their judgment would not be accepted by the unsuccessful competitors. But the truth is that medals and tokens have very nearly ceased to be regarded as an evidence of superiority in the quality of merchantable wares. Every body familiar with the methods and influences that are brought to bear in the contention and scramble for preference on such occasions, knows that the awards of examiners and judges do not determine facts, and that costly and cunningly wrought medals in gold, silver and bronze differ only in the intrinsic value of the metal from a picturesque label on a package of patent medicine. The exposition, we repeat, is a decided success in a double sense—as a grand and imposing spectacle of railway progress, and as a means of checking the mania for premiums and prizes by making it, if anything, more ridiculous than it was before.

Since writing the above, the *Railway Age* of June 28, has come to hand, containing a list of awards as far as completed, and promising also a supplemental list.

#### RUNNING TRAINS ON SUNDAY.

Every time this subject comes to the surface it elicits a little undecided talk, and then nothing more is said until after a certain interval it comes up again. Meanwhile, there is no abatement, but, on the contrary, a continual increase of Sunday work on railroads. If the running of Sunday trains were a voluntary matter on the part of individual road managers, the responsibility and blame, be it more or less, would justly be laid at their doors. Aside from conscientious scruples, a man needs rest when he is tired, even if the rest consists in mere diversion or a change of occupation. His mental and physical vigor cannot be maintained without it, and hence the suspension of ordinary business pursuits upon every seventh day, or Sunday, has become a fixed usage. It may be asked why the great army of railroad employes of every grade, or any considerable portion of it, should be made an exception. The plain and obvious reason is that necessity requires it. It may not be easy to draw the line between what is necessary and what is not necessary in the matter of running trains on Sunday, nor is it easy to draw an exact line of discrimination between rich and poor or between health and disease, but the two conditions remain distinct in each case and are practically recognizable for all that. A great continent with an average of one mile of railroad to every 530 inhabitants is a very different thing from the same continent with nothing but mud roads and turnpikes upon which to transport people and products. Railroads serve such a multitude of public and private wants which in former times had no existence, or existed only to an extent that would hardly be appreciable in these days, that it is no wonder that managers cannot prescribe by a rigid schedule which of these wants are a necessity to such an extent as to justify Sunday work, and which are not. The case is fairly illustrated in city street car travel. It is held to be right and proper for people to ride in these cars to and from church, to attend funerals, visit the sick and so on, but can the companies restrict the service to these people and exclude others who want to be carried to a picnic or a beer garden?

Railroad Sunday work, in the long run, can do no otherwise than regulate itself. The several roads and systems of roads might co-operate to keep the running of Sunday trains, both freight and passenger, at a minimum; but that any such thing will happen while the present competition exists between roads, is extremely improbable. But, really, it is not the roads or their managers who are to blame for making their employes work seven days in a week. It is that great, impersonal, irresponsible thing called the public, whose servants the railroads are, and who would raise a howl that would shake the sky if all trains should cease to move on Sundays and give the great army of trainmen their much needed rest and recreation. This all powerful, exacting public could, if it liked, co-operate with road managers in this matter; but it will no more do it in any effective way than the great mass of conscientious, well-to-do workmen will eat cold dinners on Sunday, or walk to church, to enable their cooks and coachmen to enjoy a day of rest.

The May number of the CAR BUILDER contained some strictures by a correspondent upon an editorial article in the London *Engineer* on the subject of "Railway Traffic in the United States." Our correspondent, in the communication referred to, said:

An English passenger coach weighs from 7 to 10 tons, and carries from 24 to 32 passengers; and about 15 of these coaches make a train. An American coach weighs from 25 to 30 tons (a sleeper about 40), and seats from 60 to 70 passengers. From 8 to 10 of these coaches, exclusive of baggage, express and mail cars, make an average train on our leading through lines, and the aggregate weight is three or four times as much as that of an English train. \* \* \* As regards speed, it appears that the average of express and fast passenger trains on the New York Central is fully up to the average of English trains, while the trains on the Bound Brook route between New York and Philadelphia, which are heavier than the English trains, make still better time.

Upon this the *Engineer* comments as follows:

"It appears from this that the American locomotive can run a train of 400 tons at 48 miles an hour, including stops, while the English locomotive can run a train of 1,000 tons at 48 miles an hour on long stretches of road. The average



age American passenger locomotive has cylinders 17x24 in., 4 drivers, coupled, 5 ft. diameter, 1,100 to 1,200 square feet heating surface, and carries 140 lbs. pressure. No such engine can possibly run 18 miles an hour with a gross load of 400 tons without burning 6,000 lbs. of coal per hour, or 120 lbs. per mile.

In reply we would say that the Engineer assumes more than the facts will warrant. The weight of an American engine with a baggage, mail and express car, and ten passenger cars with their passengers, is a little less—certainly not more—than 400 tons. The engine referred to has 18x26 cylinders instead of 17x24, and also 54 feet drivers. The heating surface is 1,200 to 1,300 feet instead of 1,100 to 1,200, and the pressure ranges from 150 to 160 pounds. The average speed of American express trains is between 35 and 40 miles an hour, and this, according to English time-tables, is very close to the English average. We are informed that a representative of our English contemporary, now in this country, recently rode on an American passenger engine having 17x24 or 18x24 cylinders, and hauling 12 passenger cars at a speed of 25 miles per hour on grades, and 40 miles on levels.

The Engineer also assumes that the resistance per ton of American trains at their average speed is 25 pounds, when in truth 13 pounds would be nearer the mark. Prof. Dudley's dynamograph experiments have shown that with 9 cars at a speed of 60 miles an hour, the resistance per ton is from 10 to 11 pounds.

The article in the Engineer contains a number of other points bearing upon the issue it raises which invite reply, but as our space will not allow us to copy it entire, and as our comments would not otherwise be intelligible to our readers, we must refrain from going into the subject more fully.

The attendance at the Master Mechanics' convention, at Chicago was unusually large. There was a large accession of new members, which we doubt not will help to infuse new life into the organization, for it can not be denied that like its senior contemporary, the Car-Builders' Association, its pulses have beaten somewhat languidly the past four years. It is suggested by a prominent railway journal that the consolidation of the two societies would be a great advantage to the interests they respectively represent. We do not think so. As well might locomotive and car shops be merged into one. The two departments are too distinct to coalesce unless one swallows the other, or—to put it in Hibernian fashion—unless each swallows the other. If the suggestion of a union is to be carried into effect, we shall insist that the American Society of Mechanical Engineers be included also, and then the collective ability, experience and technical knowledge of the three can be brought to bear upon every question that arises with respect to car, locomotive or other construction.

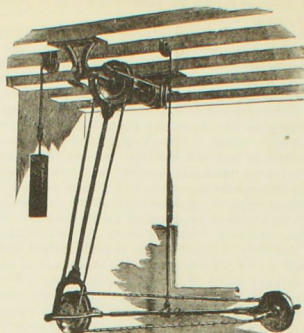
We regret that we are unable to give a full report of a portion of the discussions at the Car-Builders' Convention, as we have heretofore done in our July issue. Causes beyond our control have prevented this, and for the brief outline that we print we are mainly indebted to the *Railway Review*.

#### Book Notices.

*The Materials of Engineering: In 3 Parts. Part II, Iron and Steel.* By ROBERT H. THURSTON, A. M., C. E.—The first volume of this series, treating of Non-Metallic Materials, was noticed in our February issue. The present volume is much larger, and contains 680 pages, devoted exclusively to Metallurgy, and particularly to Iron and Steel. The contents comprise eleven chapters, with the following headings: "Qualities of the Metals; History, Principles and Materials of Metallurgical Work; Historical Sketch of Iron Manufacture; The Ores of Iron; Reduction of Ores and Production of Cast Iron; Manufacture of Wrought Iron; Manufacture of Steel; Chemical and Physical Properties of Iron and Steel; Strength of Iron and Steel; Effect of Temperature and Time on Resistance, Flow of Metal, Fatigue, Wöhler's Law, Lamhardt's Formula; Specifications, Tests, Inspection." The volume contains numerous illustrations and a comprehensive analytical index. The reputation of the author in the field of mechanical and scientific research is a sufficient guarantee of the great practical value of this work to iron workers, manufacturers, artisans and the engineering profession. Published by John Wiley & Sons, 15 Astor Place, New York. Price \$5.

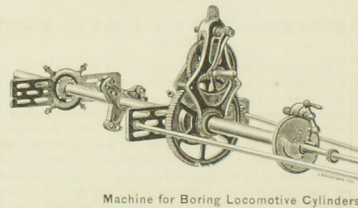
*Practical Carpentry, being a Guide to the Correct Working and Laying Out of all Kinds of Carpenters and Joiners Work.* By FRED. T. BOWEN.—This little volume makes no pretension to an exhaustive treatment of the subject, but is merely designed as a practical hand book for workmen who have not had the benefit of preparatory instruction and study. It contains much in a compact form and at a moderate price, and is adapted to the comprehension of every apprentice boy. It should have a place in every workman's tool chest. Illustrated by engravings. Published by the Industrial Publication Co., New York.

*Pusher System of Lighting.*—We have received from the Pusher Lighting Co., 19 William street, New York, a handsomely printed pamphlet containing a full explanation of this method of lighting railway cars, stations, steamboats and buildings, with particulars of the cost of same as compared with that of oil and coal gas, and illustrated with drawings showing method of manufacture and application to cars. The system is in use on a large number of European railways, and is now being introduced in this country. The Car-Builders have from time to time during the last five years contained descriptive notices of it, but those who desire to get a clear idea of the working of the apparatus in its most improved form can do so by procuring a copy of the pamphlet from the publishers, as above.



Swing-Frame Grinding and Polishing Machine.

This machine is designed to be suspended from overhead, and is especially adapted for foundries and large machine shops. The work is placed on the floor, bench or truck, the emery wheel is swung at will to conform to the straight or uneven surface. The wheel, being driven from a swinging countershaft, suspended by a telescopic rod with a universal joint, may be carried back and forth or swung at will; and the frame carrying the wheel being also suspended by the counterpoise weights joined to a similar horizontal telescopic rod, makes it easy to twist the wheel over to any angle or give it any range of movement up or down. The operator can seize the handles on each side of the wheel and carry it to any portion of the work desired. A boy can operate it. By substituting a circular "Scratch Brush" for the wheel, its value in the cleaning room of a foundry is apparent to all familiar with the old laborious hand process. The machine is also a valuable accession to the machinery of any general machine shop for grinding off fins, spurs and imperfections, instead of chipping and filing. It leaves the work looking better and may be performed by a cheaper hand, and by substituting a polishing wheel for the grinding wheel, the work can be finished to a fine polish. A rest, which supports the wheel by the two handles, is made to stand on the floor, thus making a good stationary grinder. Manufactured by the Union Stone Company, Boston, Mass.



Machine for Boring Locomotive Cylinders.

The cut represents an improved machine for boring cylinders of locomotive engines. The boring bar is independent of any support, the rods A A being fastened to the ends of crosshead E which supports the bar in cylinder and to an adjustable swivel crosshead B C on end of screw, and takes the whole of the thrust and torsion strain of the bar; it makes no difference what position the bar is in, the end thrust is always in exact line with it, causing it to cut steady, smoother and truer. The feed nut D D is in halves, held together by the round nut F so that when the cut is through cylinder, unscrew the round nut F, open the half nuts D D, loosen the tools so that they will not mark cylinder in moving back, push in the end of bar G G until the cutter head is in its place, and it is ready for another cut. The feed can be thrown out of gear at any time by simply screwing up the round milled nut I, and by loosening the nut the machine will feed automatically. An attachment is made with the driving power, one end fastened at H, the other end with the crosshead at E for holding the power in position rigid and firm; by placing the crosshead E vertical the driving power can stand horizontal. These bars are accurately ground, bearings are scraped out to fit and they will stand a great amount of wear before loss of motion occurs. Manufactured in three sizes, by the L. B. Flanders Machine Works, Philadelphia.

ONE of the most attractive features of the Chicago Exposition was the display of electric lights. The Western Edison Co. operated a 350 and 60-light 16-candle dynamo, and also displayed a full line of 10, 16, 32, 50 and 100-candle lamps burning on the same circuit, as well as a great variety of colored lamps with beautiful effect. The lights were maintained at a uniform candle power by means of an automatic regulator, and were remarkable for their softness and steadiness. The rooms of the press representatives and the large lecture room were illuminated in a most satisfactory manner, also the space occupied by the large machinery exhibited of J. A. Fay & Co. The fountain in the center of the main building was lighted by 150 Edison lamps placed under the spray and falling water, producing an effect that was exceedingly attractive. The Edison system of underground conducting was also shown in its adaptation to large cities. The United States, Brush, Fuller, and other systems were also exhibited. The Edison Company has contracted to light the Louisville Exposition with 4,850 sixteen-candle lamps.

THE new Double Drum Sand-Papering Machine, with patent Brush Attachment, manufactured by the Cordesman & Egan Co., of Cincinnati, is superior to all other devices of the kind for smoothing and polishing fine cabinet work, and is especially adapted to the inside finish of passenger cars. A. Cutler & Son, Buffalo, N. Y., and Aternathy Bros., of Leavenworth, Kan., have recently purchased these machines after carefully examining their operation.

MR. GEORGE H. CAREY, who was for many years connected with James L. Howard & Co., of Hartford, Conn., and representing during the past four years the well-known firm of Post & Co., of Cincinnati, has recently identified himself with the Dayton Manufacturing Co., of Dayton, Ohio. Mr. Carey is admirably qualified, by his long experience in the car-furnishing trade, to represent this enterprising company.

THE Elkins Manufacturing and Gas Co., of Philadelphia, have sold its interest in the Ajax Metal and trade-mark, to J. G. Hendrickson, F. J. Clamer and Frank Bushnell of that city, who will continue the manufacture of the metal, trading as the Ajax Metal Co.

THE WOVEN WIRE CAR SEAT, patented by Henry Roberts, of Hartford, Conn., combines in a remarkable degree the qualities of elasticity, lightness, cleanliness and durability. The seat has a perfect spring edge, may be used without hair, with a simple covering of canvas or plush, or with no covering. Only one pound of hair is required to cover seat and back cushion. The small quantity of upholstery material is a great saving in cost. The seat is in use on a number of Eastern and Western roads.

#### Complimentary.

ON BOARD TRAIN, JUNE 11, 1883.

At an informal meeting of the ladies and gentlemen comprising the party who were recipients of the kindness of Messrs. John W. Cloud, of the Pennsylvania R. R., and L. Packard, of the Baltimore & Ohio Railroad, in the tender of transportation from New York to Chicago on sleeping cars "Newark" and "St. Vernon," to attend the annual meeting of the Car-Builders' Association, the following resolution was unanimously adopted: Resolved, That we thank the tender to the above named gentlemen for their kind attention and special efforts made for our pleasure and comfort during the journey; and also through them to the officers of their respective roads, for their courtesy in affording us an opportunity to enjoy the attractive and beautiful scenery for which these roads are justly celebrated.

The names of the gentlemen comprising the party are as follows: J. F. Jones, Hartford, Conn.; Western; F. D. Adams, John Chamberlain, Wm. Brownell, and O. T. Bush, Boston; Albany; Chas. Blackwell, Norfolk & Western; C. E. Garey, D. Holt, C. H. Burchard, Peter Smith, and J. H. Brady, New York Central; John S. Lentz, Lehigh Valley; J. V. Maxwell, Geo. E. Frazer, C. A. Goodrich, and F. K. Frost, Philadelphia; R. R. F. H. Minshall, New York, Ontario & Western; J. N. Miesbach, N. York, L. Erie & Western; M. M. Pendleton, Seaboard & Roanoke; D. C. Richardson, Boston & Maine; H. A. Webster, Narragansett; E. J. V. Cloud, R. B. Phelps and G. W. Stratton, Pennsylvania R. R.; Samuel Stevens, Old Colony; C. C. Williams, West Jersey; L. Packard and J. S. Merrill, Balt. & Ohio.

#### Our Directory.

We note the following changes since our last issue:

*Central Pacific*.—J. H. Whitte is appointed Superintendent of Truckee Division, vice Frank Free, resigned.

*Chesapeake, Ohio & Southwestern*.—G. A. Haggerty has been appointed Superintendent of Machinery and Motive Power, in place of W. D. Robb, resigned.

*Chicago, Burlington & Quincy*.—Wm. Irving has been appointed General Purchasing Agent, with office in Chicago.

*Chicago & Alton*.—C. H. Chappel, heretofore Acting General Manager, succeeds J. C. McMullen as General Manager. Mr. McMullen having been made Vice-President.

*Chicago & Atlantic*.—J. C. Williams has been appointed General Superintendent.

*Florida Southern*.—Jas. D. Hollister has been appointed Superintendent, vice H. S. Ming.

*Intercolonial*.—J. J. Wallace, formerly Traffic Auditor, has been appointed Superintendent of the Halifax and St. John District, vice J. Coleman, appointed Superintendent of the Prince Edward Island Railway.

*Mexican National*.—J. M. Winslow is appointed Master Mechanic in place of J. C. Munro, resigned.

*Mobile & Ohio*.—Frank Jordan has been appointed Purchasing Agent for this company, with headquarters at Mobile, Ala.

*Minneapolis & St. Louis*.—E. Rider has resigned the position of Superintendent, and his duties, until further notice, will be performed by W. H. Truesdale, Vice-President.

*New London Northern*.—Geo. W. Bentley has resigned the position of Superintendent.

*New York Central & Hudson River*.—John Orton has been appointed Master Mechanic of the Eastern Division, with office at West Albany, N. Y. Mr. Orton was formerly on the Canada Southern.

*New York, Susquehanna & Western*.—A. M. Britton has resigned the position of General Manager, and C. D. McKelvey has been appointed Assistant Superintendent. C. T. Demarest has been appointed Purchasing Agent.

*New York, Lake Erie & Western*.—Geo. H. Griggs has been appointed Master Mechanic of the Western Division, vice R. Gunn, who has been transferred to the Car Department at Buffalo.

*New York & Long Branch*.—Jas. F. Randolph has resigned the position of Superintendent.

*Northern Pacific*.—Robert Walker has been appointed Master Car-Building of the Western Division, with office at Sprague, W. T. Mr. J. Evans is appointed Master Mechanic of Pend d'Oreille Division, with office at Sprague, as above.

*Pittsburgh, Cincinnati & St. Louis*.—Edward R. Wall has been appointed Superintendent of Motive Power, vice R. H. Sells, who succeeds the late Howard Fry on the New York, West Shore & Buffalo.

*Prince Edward Island*.—James Coleman has been appointed Superintendent, vice L. B. Archibald, resigned.

*Rome, Watertown & Oleanburg*.—H. M. Britton has been appointed General Manager. He has for the last few years been General Manager of the New York, Susquehanna & Western. E. A. Vanhorne has resigned his position as Superintendent.

*Western & Atlantic*.—W. R. Webster, for the last 12 years Purchasing Agent of the road, died at Atlanta, Ga., June 9.

*Virginia & Truckee*.—C. F. Mason has resigned the position of Purchasing and Supply Agent, to go into the mining machinery business at Salt Lake City, and Hume Yernigton has been appointed as his successor.



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CHICAGO & NORTHWESTERN RAILROAD CO., R. W. Hamer, Purchasing Agent, Chicago, Ill.  
LEHIGH VALLEY RAILROAD CO., L. Chamberlin, Purchasing Agent, Philadelphia, Pa.  
NORTHERN RAILROAD OF CANADA, F. W. Cumberland, Superintendent, Toronto, Ont.  
SABOTEUR RAILROAD CO., G. W. Beach, Superintendent, Waterbury, Conn.  
PHILADELPHIA, WILMINGTON & BALTIMORE RAILROAD CO., S. A. Hodgman, Superintendent of Motive Power, Wilmington, Del.  
NEW YORK, NEW HAVEN & HARTFORD RAILROAD CO., R. N. Dowd, Commissary, New Haven, Conn.

UNION PACIFIC RAILROAD CO., A. D. Clark, Purchasing Agent, Omaha, Neb.  
KANSAS CITY, MO., A. D. Clark, Purchasing Agent, Omaha, Neb.  
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GRAND TRUNK RAILWAY, N. Wall, Port Huron, Mich.  
LITTLE ROCK & FORT SMITH RAILROAD CO., T. Hartman, Purchasing Agent, Little Rock, Ark.  
GILBERT & HUGH CO., Troy, N. Y.  
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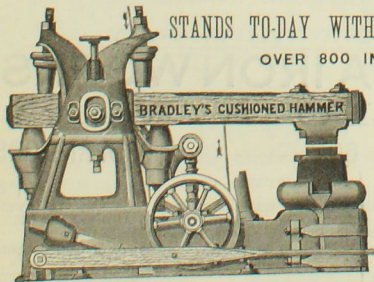
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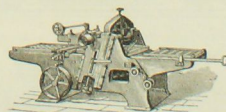
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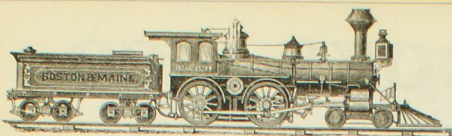
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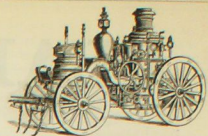




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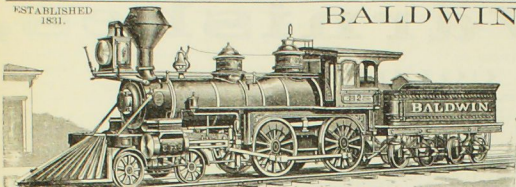
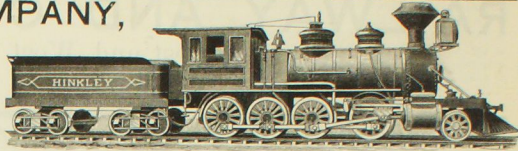
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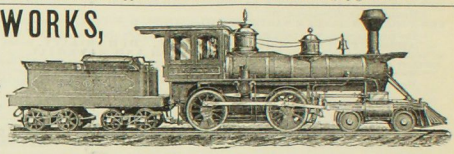
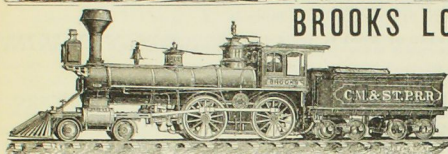
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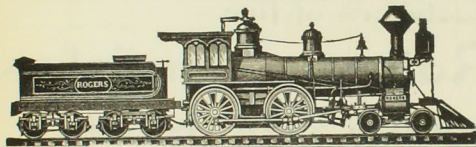
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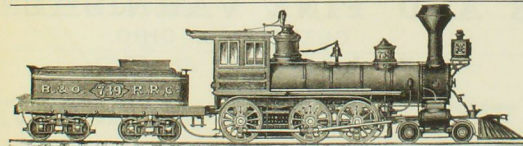
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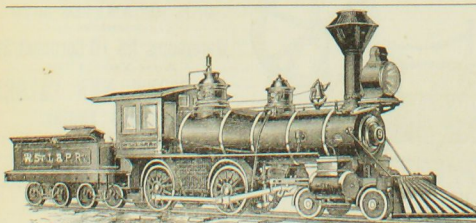
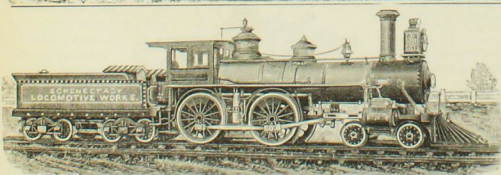
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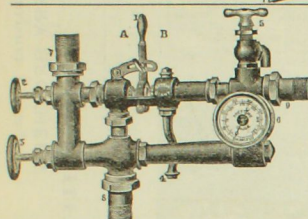
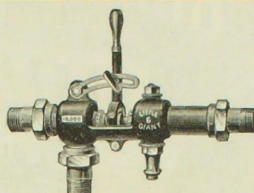


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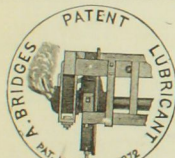
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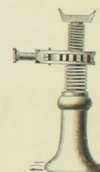
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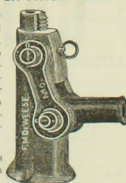
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Are used by about two  
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Superior in every point to  
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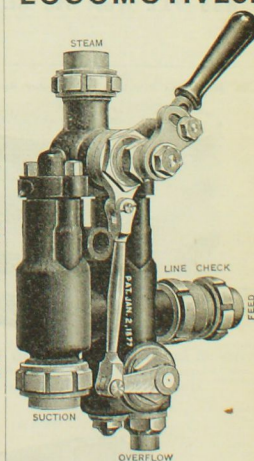
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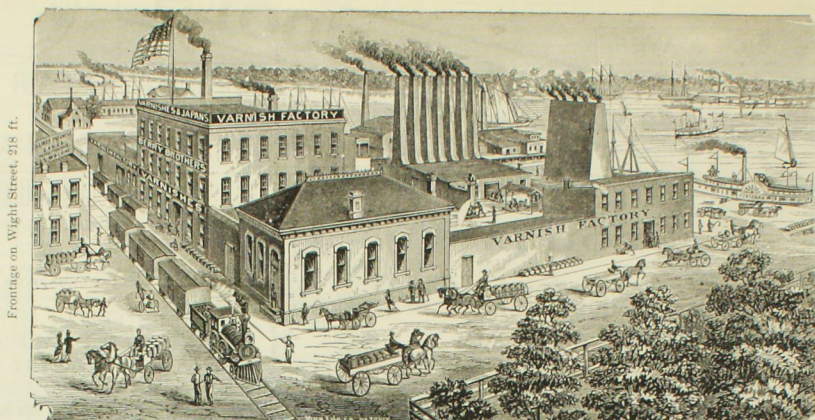
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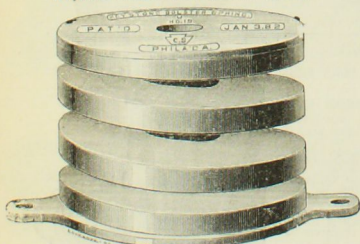
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Keystone Single Coil Bolster Spring



Patented Aug. 16th, 1881, and January 3d, 1882.  
Capacity, 35000 Pounds Each.  
Motion Very Soft and Slow



**KEYSTONE CAR SPRING WORKS.**

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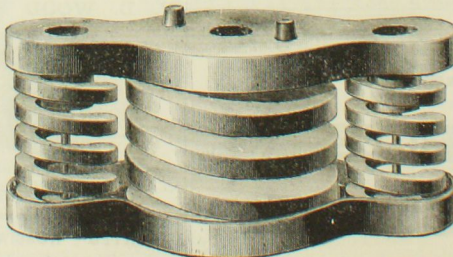
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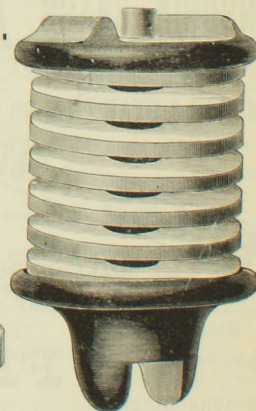
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KEYSTONE GRADUATED BOLSTER SPRING

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Capacity 40000 Pounds Each—Motion Softer than Elliptics.  
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Patented January 3d, 1882.





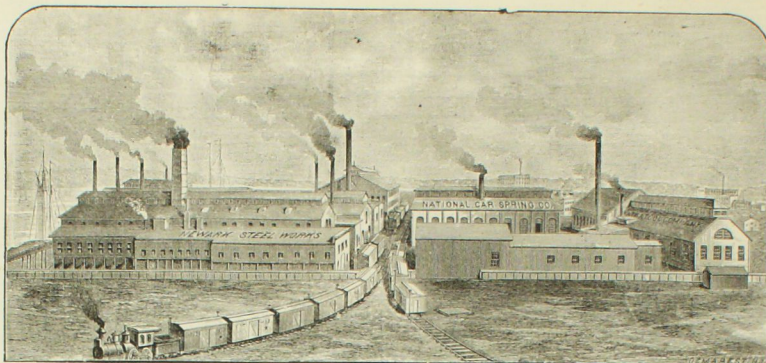




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We make  
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## IN THE PATENT FIGHT

BETWEEN

D. A. HOPKINS, of 113 Liberty Street, N. Y.,

PATENTEE AND MANUFACTURER OF

## SELF-FITTING JOURNAL BEARINGS,

AND

T. V. LE ROY.

A SECOND DECISION WAS RENDERED JUNE 7, 1881,  
**IN FAVOR OF HOPKINS.**

The closing paragraphs of said decision read as follows:

"As the proofs stand, therefore, Hopkins was the first to conceive, the first to disclose to others, the first to embody in models, the first to reduce to practice, and the first to apply for a patent. Le Roy was first to obtain a patent, but under circumstances which do not give him the prima facie case which a patent usually implies."

"We must find priority of invention to be with D. A. Hopkins, and affirm the examiner's decision."

H. H. BATES,  
R. L. B. CLARKE,  
R. G. DYRENFORTH,  
Examiners-in-Chief.

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After years of practical experience in manufacturing HOT BOX CURES AND JOURNAL LUBRICANTS, we do not hesitate to stake our reputation on the statement that

POLAR GREASE NO. 1 POSSESSES MORE MERIT AS A

#### HOT BOX CURE,

And yields a greater mileage as a JOURNAL LUBRICANT than any compound now sold.

**FOR HOT BOX CURE,** apply to Journal under all circumstances, and in similar manner as when tallow is used - it will do a better service.

**FOR JOURNAL LUBRICANT,** thoroughly incorporate the grease with W. Va. Oil, till it is sufficiently fluid for conveniently pouring into boxes or saturated waste in buckets. So prepared, the compound makes a cheap lubricant, a safeguard against heating Journals, nets a large reduction in mileage cost, and a saving in brasses, the latter alone - paying the cost of grease.

CORRESPONDENCE REQUESTED. - We invite trial orders with the greatest confidence, guaranteeing satisfaction in every particular, or no sale. Respectfully,

INLAND OIL COMPANY,  
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RAILROAD CAR AND LOCOMOTIVE FORGINGS,  
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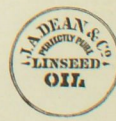
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All Linseed Oil bearing the above brand delivered by us is of OUR OWN MANUFACTURE, and guaranteed absolutely pure. Our BOILED OIL will be POSITIVELY BOILED.

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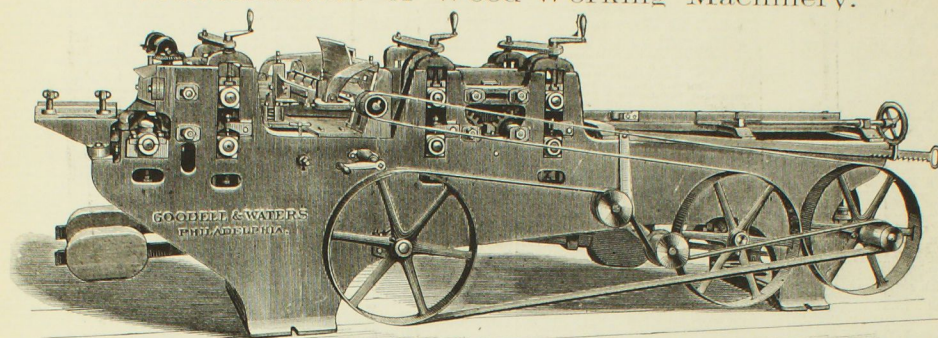






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KEYSTONE RAPID FEEDING FLOORER

For RAILROAD SHOPS, CAR-BUILDERS, PLANING-MILLS, BRIDGE BUILDERS, SASH, DOOR and BLIND MAKERS.

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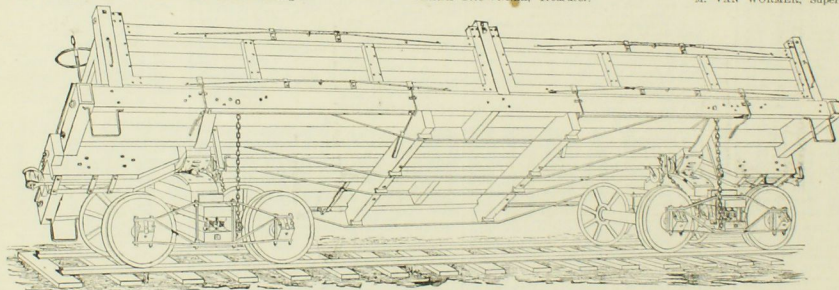
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## THE U. S. CAR CO.'S SCREW LEVER DUMP AND COAL CAR.

SIMEON BROWNELL, President and General Manager.

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(M. VAN WORMER PATENTS.)

This car has a capacity of eighteen to twenty tons, and can be handled by one man, discharging its load instantly. The device can be applied to flat and grain cars. The car is under perfect control at all times, and can be held at any elevation or dumped suddenly if desired. For construction trains, cars with this device would be invaluable. The mechanism is strong, simple and durable. The following railroads and car-builders are building cars with this screw lever attachment, viz.

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Gilbert Car Mfg. Co., Troy, N. Y.

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Boston & Maine R. R. Co.

Wells & French Car Co., Chicago.

Cleveland Rolling Mills Co., Cleve-

land.

Gill Car Mfg. Co., Columbus, Ohio.

Rock Island & Mercer County Rail-

road.

Ontario Car Co., London, Ontario,

Canada.

UNITED STATES CAR COMPANY, 48 CONGRESS STREET, BOSTON, MASS.

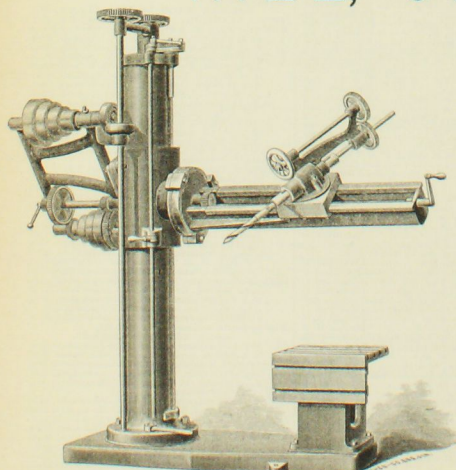
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OFFICES: 42 Oliver Street, Boston, Mass.

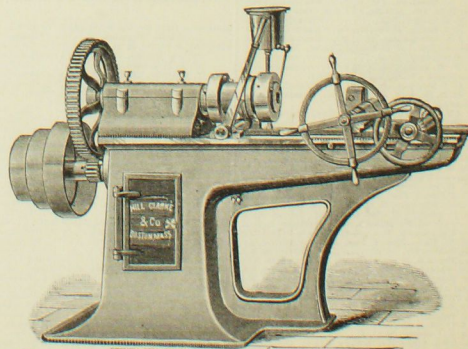
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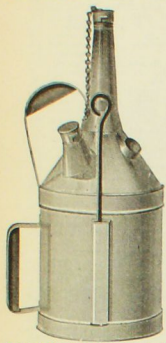






## NOYES' Patent Liquid and Condensed COOLER.

For Cooling Railroad Car and Steamboat Journals and Bearings of all Kinds, and for Mixing with Other Oils.



The attention of those who are running heavy journals is respectfully invited to the above Liquid Cooler. It has been successfully used for upward of ten years, and is constantly growing in favor, as its merits become known, and we are confident that practical men cannot fail of being convinced that our preparation deserves their candid attention. What we claim for it is—

**That it will Cool a Hot Journal When in Motion,** and extinguish the flame when the box is on fire; that its use will, in a great measure, prevent the occurrence of a hot journal, and save the expense, delays and annoyances incident thereto; that it will eliminate the heat from a journal at a temperature greatly below the point required to melt the lubbitt, preventing the accumulation of heat, and by a timely application save it from destruction; that its non-inflammable elements (where waste is used) permeate the waste and prevent its taking fire; that it keeps the journal smooth and polished, preventing unnecessary friction; that its combination is based upon true scientific principles, which renders it impossible to fail in its results, and is the

**Only Preparation that will Cool a Hot Journal** while it is in motion, as attested by certificates below; that one thorough application on a hot journal will do more execution in cooling than the constant application of water for half an hour, besides doing it evenly and without loss of time.

**Every Railroad Train or Steamboat** should have a can of the Liquid Packing on board, with the directions for its use pasted upon it, and thus have always at hand the means of effectually cooling a hot journal, and thereby avoid the expense, danger and trouble from this cause.

### WHAT RAILROAD MEN SAY OF IT.

SALEM, AUG. 7, 1872.  
Mr. P. NOYES.—Dear Sir: I have been using your Liquid Packing for cooling car journals for some time past, and have been well pleased with it. I have had occasion to use it a number of times, under full main cars, and it has been a complete remedy in every case of hot journals.

Every train should be provided with it, as it is a saving of time and expense in the running of trains, provided it is applied and cared for according to directions for using.

J. P. SORREY,  
M. C. R. Eastern Railroad,  
SALEM, AUG. 28, 1880.  
I can recommend Noyes' Liquid Cooler as an excellent article to carry on trains for use in case of Hot Journals, which it cools, without injury to the journals, more effectively than anything I know of.

J. H. BILLENS,  
M. C. R. Eastern Railroad.  
Our Liquid Cooler is now in use, and has been from one to eight years, upon the following roads, and we have numerous recommendations from them: Boston & Maine R. R., Boston & Lowell R. R., Intercolonial R. R., Boston, Concord & Montreal R. R., Pittsburgh R. R., Eastern R. R., New York, New Haven & Hartford R. R., New York & New England R. R., Connecticut River R. R., Delaware & Hudson Canal Co., Old Colony.

In ordering state whether it is desired for general Lubricating or Cooling. The condensed is sold, especially for Lubricating, by the Pound, and the Liquid by the Gallon, as low as any article of the quality in the market.

SEND FOR A BARREL. NO CHARGE UNLESS IT DOES ALL WE STATE.  
MANUFACTURED BY THE  
**NOYES MANUFACTURING CO., P. Noyes, General Manager.**  
47 INDIA STREET, BOSTON.

We are sole agents for the Swift "Muffer" for Locomotives, Improved Car Axle-Box Dust Guard, and are Agents for the Ormsby Patent Car-Sash Blade and Lock.

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BUILDERS OF  
NUT, BOLT AND WASHER MACHINERY  
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NUTS, BOLTS, WASHERS, PLOW BOLTS, Etc.  
59 & 61 S. WATER ST., CLEVELAND, O.

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The company proposes to license railroads to use this valuable article for packing, on very liberal terms. Send for circular to

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MANUFACTURERS OF  
**LEVER,  
COMPOUND LEVER,  
AND  
Screw Jacks.**

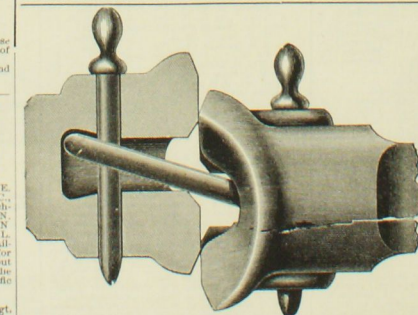
We make 27 varieties of these Jacks, and have more in process of construction. Send for Illustrated Catalogue and Price List.



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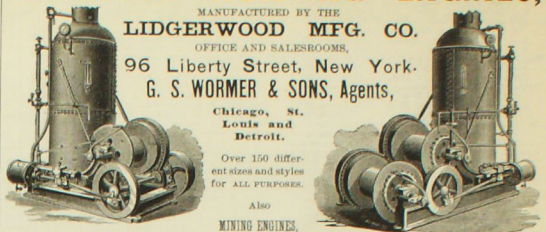
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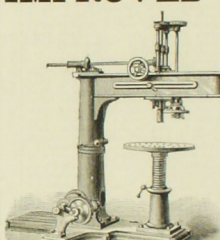
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With adjustable Guides for taking up Wear; Keeps the Dies Matched and Prevents the Breakage of Piston Rods. Sizes from 200 lbs. to 30 tons.

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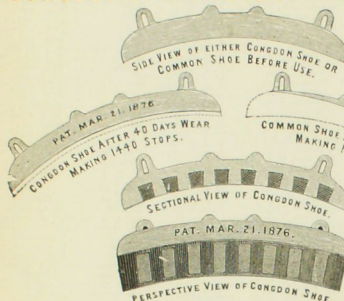
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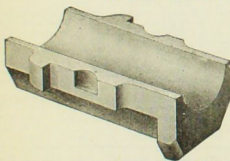
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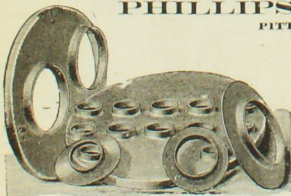
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 BOILER HEADS AND FLUE HOLES PLANGED TO ORDER.  
 SEND FOR PRICE-LIST.

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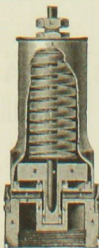
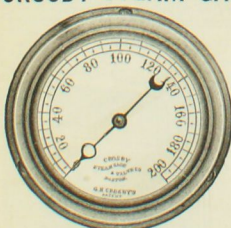
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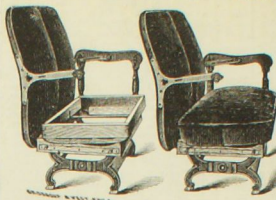
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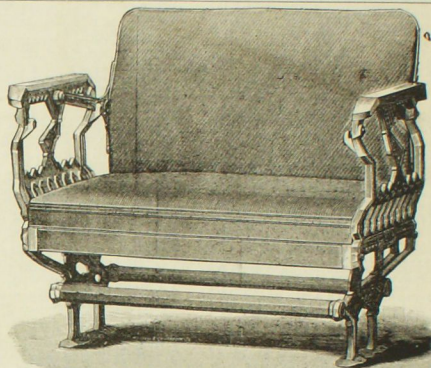


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NO BREAKING BY REVERSING RAPIDLY.  
 HUNDREDS OF COACHES SEATED  
 WITH THIS CAR SEAT.

In the Penna. R. R. Standard Fastlake seat, and used extensively by the Lehigh Valley, C. & D. Quaker, Savannah, Florida & Western, and many other railroads. It meets the long needed want of a reversible seat that elevates the cushion in front, and also makes it wider. Without hinges, cams, or any other mechanical appliance. Works automatically.

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For long routes and first-class cars the seats we are now making with SPRINGS in both seats and backs, as shown in above cut, are very popular, and are especially desirable for summer travel, being clean, comfortable and cool.

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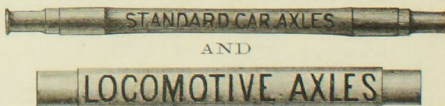
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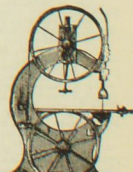
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For Cooling Hot Journals. We would especially call the attention of Railroad Men to this compound, as it will immediately Cool a Hot Journal while the Cars are in Motion, and no Journal will heat where the box is packed with it.

Some genuine without this Trade Mark. Discontinue. For Cars and Engines, pack the Box so that the Compound will come in contact with the Bearings and Journals, using waste saturated with oil.

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PLANERS, MATCHERS,

ENDLESS BED SURFACES,

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General Machinery for Working Wood.

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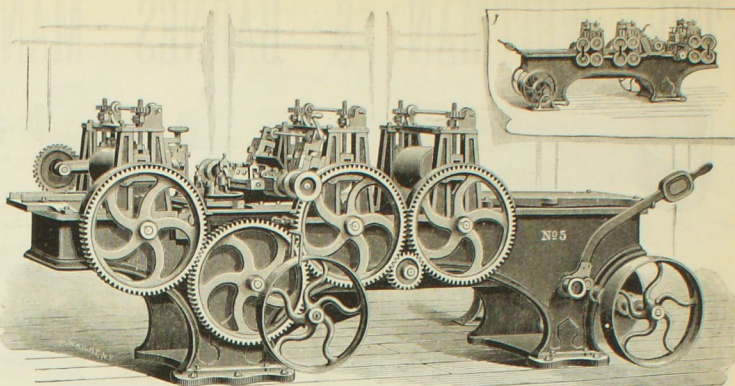
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**1882.--IMPROVED IRON STEAM SHOVEL AND DERRICK.**

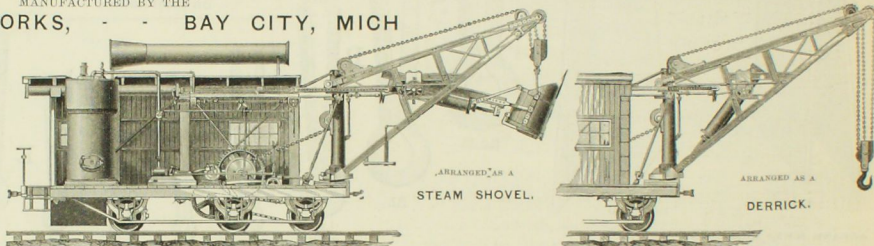
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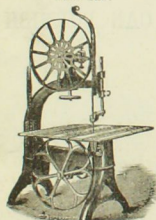
Iron and Wood.



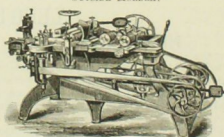
C. R. WELLS, Sec'y, Bay City, Mich.

McMANN &amp; BRO., 28 Gold St., N. Y.

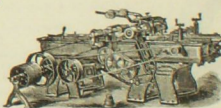
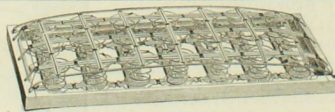
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**MANUFACTURERS OF WOOD-WORKING MACHINERY.**

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The Latest Improved  
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SPRINGS for Car Seats,  
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world. Adopted and  
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Builders in the United  
States and Canada.

Spring in a Car Seat Frame.

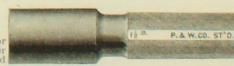


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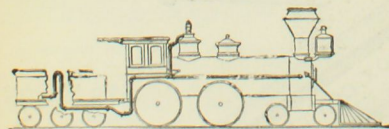
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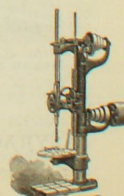
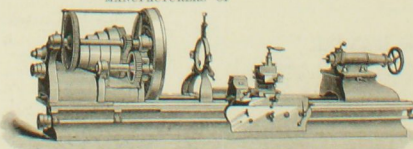
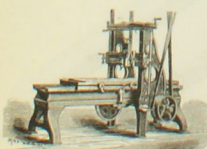
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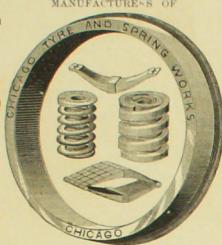
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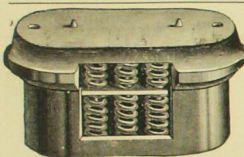
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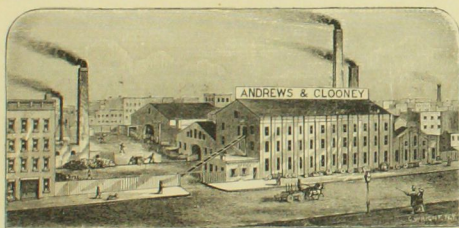
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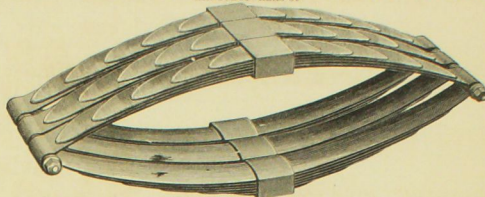
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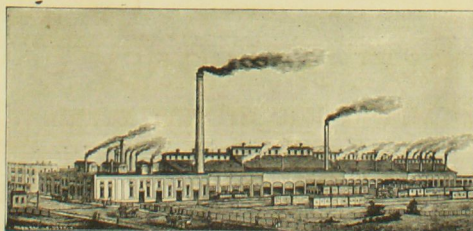
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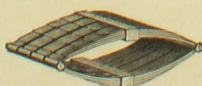
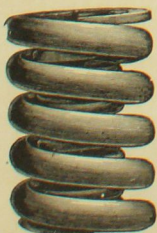
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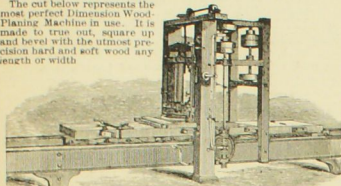
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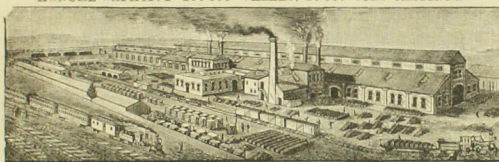
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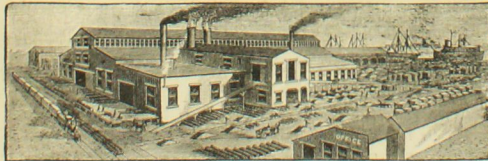
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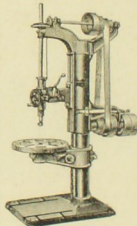
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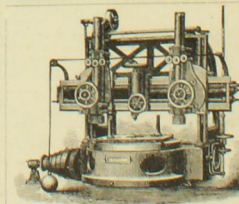
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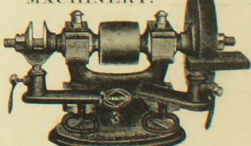
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